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(SECOND SESSION)

PARLIAMENT OF NEW SOUTH WALES

REPORT
OF THE
DEPARTMENT OF AGRICULTURE
NEW SOUTH WALES

FOR THE
Year ended 30th June, 1956

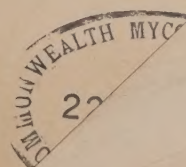
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AS AT 30th JUNE, 1956

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Assistant Director of Agriculture	Dr. H. J. HYNES.

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Pastures Protection Officer	S. W. WISE.
Legal Officer	J. L. HAGER.
Architect	H. A. BROWNE.
Biometrician	F. C. MCCLEERY.
Supervisor, Experiment Stations and Farms.....	L. JUDD.
Executive Officer, Co-ordinated Extension Services.....	L. J. GREEN.

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Western Region	B. D. AMENT.
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Agricultural Organiser	G. A. CRAWFORD.
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Division of Plant Industry—

Chief	W. H. G. POGGENDORFF.
Deputy Chief.....	A. PEARSON.
Principal Agronomist (Pastures)	C. K. VEARS.
Principal Agronomist (Research)	Dr. S. L. MACINDOE.
Principal Agronomist (Vegetables)	A. C. ORMAN.
Acting Principal Agronomist (Extension)	G. NICHOLSON.

Division of Horticulture—

Chief	H. BROADFOOT.
Deputy Chief.....	H. W. EASTWOOD.
Principal Fruit Officer (Extension)	J. A. BALLANTYNE.
Principal Fruit Officer (Research)	Dr. F. T. BOWMAN.
Senior Inspector (Export and Import Branch).....	L. T. BILBE.

Division of Animal Industry—

Chief	C. C. BLUMER.
Deputy Chief.....	R. M. WATTS.
Director of Veterinary Research	G. EDGAR.
Chairman, Board of Tick Control, Lismore	J. N. HENRY.
Principal Veterinary Officer	N. K. GOLDING.
Principal Livestock Officer (Sheep and Wool)	A. K. CANTRELL.
Principal Livestock Officer (Horses, Cattle and Goats)	W. J. B. MURPHY.
Principal Livestock Officer (Pigs).....	G. M. D. CARSE.
Principal Livestock Officer (Poultry)	V. H. M. BRANN.
Principal Livestock Officer (Apiculture)	A. A. CLEMON.

Division of Dairying—

Chief	G. MCGILLIVRAY.
Deputy Chief.....	A. C. SMALL.
Principal Dairy Officer	J. D. L. MCGIBBON.
Principal Dairy Officer (Herd Improvement)	I. W. SCOTT.

As at 30th June, 1956
Department of Agriculture—*continued.*

Division of Science Services—		
Chief		Dr. R. J. NOBLE.
Chief Biologist		Dr. C. J. P. MAGEE.
Chief Entomologist		S. L. ALLMAN.
Chief Chemist		T. H. JOHNS.
Chief Botanist and Curator, Botanic Gardens and National Herbarium		R. H. ANDERSON.
Division of Information and Extension Services—		
Chief		H. PARRY BROWN.
Editor of Publications		R. J. K. SYNNOTT.
Organiser, Agricultural Bureau		J. J. SLATER.
Senior Extension Officer (Women's Service)		Miss N. M. FOSKETT.
Division of Marketing and Agricultural Economics—		
Chief		C. G. KING.
Principal Economics Research Officer		P. C. DRUCE.
Hawkesbury Agricultural College—		
Principal		H. R. RICHARDSON.
Deputy Principal		A. JOHNSON.
Farm Supervisor		F. C. MORRIS.
Wagga Agricultural College and Experiment Station—		
Principal		B. DOMAN.
Farm Supervisor		J. G. BALLANTYNE.
Wagga Agricultural Research Institute—		
Director		Dr. A. T. PUGSLEY.
Experiment Farms and Stations—		
Bathurst Experiment Farm ...	Manager	J. A. HOLBECH.
Condobolin Experiment Farm ..	Manager	H. A. W. WOODWARD.
Cowra Experiment Farm	Manager	W. R. WATKINS.
Glenfield Veterinary Research Station	Director	G. EDGAR.
Gosford Citrus Experiment Station	Officer-in-Charge	L. F. MANDELSON.
Grafton Experiment Farm ...	Manager	C. E. COLLINS.
Griffith Viticultural Nursery...	Superintendent	A. C. CLIFTON.
Leeton Experiment Farm	Manager	C. R. HOOD.
New England Experiment Farm ..	Manager	E. C. POWELL.
Poultry Experiment Station, Seven Hills	Manager	D. C. DUNCAN.
Tamworth Agricultural Experiment Station	Officer-in-Charge	J. A. LOVERIDGE.
Temora Experiment Farm ...	Manager	F. D. MACKENZIE.
Trangie Agricultural Experiment Station	Manager	J. H. BALLARD.
Wollongbar Experiment Farm ..	Manager	W. J. C. HUDSON.
Yanco Experiment Farm	Manager	B. O. FRENCH.

* For details of staff of the various Divisions and Branches see New South Wales Department of Agriculture brochure "Directory of Officers".
For staff number totals see tabulation in this Report, Page 18.

NEW SOUTH WALES

DEPARTMENT OF AGRICULTURE

Report of the Under Secretary and Director to the Minister for Agriculture
and Food Production for the Year Ended 30th June, 1956

Department of Agriculture,
Sydney, 10th September, 1956.

Dear Sir,

Herewith my Report of the Department of Agriculture for the year ended 30th June, 1956.

Production Trends.

The State's primary production notably increased on that of 1954-55. Output of wool, wheat, oats, butter, cheese, and apples were considerably higher. Sheep and beef cattle numbers also increased.

From early February, 1956, to the end of the financial year above-average rainfall prevailed in most areas and practically all coastal and inland rivers flooded on a number of occasions. Individually the floods were less severe than those in the previous year and stock losses were relatively light. Prior to the continual wet weather, conditions had favoured pasture growth, but in the latter half of the twelve months the excessive rain caused rank growth which was particularly unsuitable for sheep and led to a high incidence of disease.

The 1955-56 wheat crop was greater than that of the previous season despite a rust epidemic. Record yields per acre were obtained but much of the grain was of low quality. The area sown to wheat for the 1956-57 crop will be substantially less than in the previous season because the wet conditions have hindered and in many localities prevented soil preparation and sowing.

A record oat crop was harvested but, as with wheat, the 1956 sowings will be greatly reduced. At the end of June, 1956, the prospects of the State's cereal crops were the worst for many years.

Production of other cereals showed some decline. The rice crop was well below the record production of the previous year. Exceptionally wet weather delayed harvesting operations and adversely affected grain quality. Maize production also declined. Many sowings suffered damage by the wet weather or were destroyed by floods, and grain quality in general was poor.

Sheep numbers increased substantially but sheep and sheep husbandry suffered from the continual wet weather and the rank pasture growth. Shearing was delayed by a strike which also adversely affected husbandry, but this was settled before the end of the financial year. The volume of wool sold in New South Wales in 1955-56 was approximately 7 per cent. greater than in the previous year.

Cattle numbers also increased. The pig population declined.

Despite floods and sodden pasture areas, butter and cheese production increased.

Egg production declined, due partly to the weather and partly to economic factors.

Output of other livestock commodities varied little from the previous year's levels.

Apple production increased to a marked extent, but output of pears was well below the record of the previous season. Floods and excessive rain seriously affected citrus production, especially in coastal citrus districts.

The supply of farm machinery further improved. With the exception of a few types, there was no shortage. Availability of farm materials and general requisites also improved, in part to less demand, reflecting falling commodity prices, and in part an absolute increase in supply.

High protein feedstuffs were in adequate supply throughout the year. Superphosphate was also more readily available than in many years past.

Food Production Policy.

The State has continued to co-operate with the Governments of the Commonwealth and the other States through the Australian Agricultural Council and the Standing Committee on Agriculture, with a view to selective expansion of food production. Particular attention has been paid to those industries for which export prospects appear most favourable, and also to means of lowering production costs and of increasing efficiency in the rural industries.

Production potential of most of the State's rural industries continued to expand. However, mainly because of lower commodity prices and to a lesser extent, credit restrictions, the rate of farm development declined somewhat. This decline is unlikely to have a marked effect on output for some time but must be regarded apprehensively in view of the important need to expand Australia's export production.

Because of the difficulties inherent in existing Commonwealth credit policies this State has recommended thorough review and investigation of the effect of credit restrictions and credit policy generally on agricultural development. This will be discussed by the Australian Agricultural Council early in the new financial year.

Concessional depreciation allowances exclusive to the rural community continued during the year, and again played a part in encouraging farmers to develop their properties.

Only a few important farm requisites, including steel fencing posts and to a lesser extent fencing wire of various types, were in short supply. Unfortunately, the general improvement in the supply-demand position for farm requisites is due at least in part to a falling off in demand, because of lower commodity prices.

The market outlook for many of the State's major rural commodities deteriorated.

Wool prices showed a further marked fall; the average price for the season was approximately 14 per cent. below the level of prices in the 1954-55 season.

Wheat prices also fell and in the latter part of the financial year, the first time for a decade, average export realisations for wheat were below the official cost of production. However, the level of sales on export market has been reasonably satisfactory, and it is anticipated that wheat sales from the 1955-56 season will be substantially in excess of sales in the previous year. Nevertheless, owing to the big 1955 harvest, stocks at the end of the 1955-56 season are likely to show a further increase above the post-war record level attained in November, 1955.

There was a marked fall in export butter prices, although some improvement occurred in latter months.

The outlook for beef, mutton and lamb remained reasonable.

As for some time past, difficulties were experienced in disposing of the output of a number of other rural commodities, including eggs, pigmeats, processed milk products, and dried vine fruits. Accordingly, general policy at present is not designed to encourage significant expansion in their output except in so far as may be necessary to supply the increasing demands of the growing local market.

Australian Agricultural Council and Standing Committee on Agriculture.

One meeting of the Australian Agricultural Council was held, at Canberra in July, 1955. Three meetings of the Standing Committee on Agriculture were held, viz., at Canberra in July, 1955; Adelaide, in August, 1955; and Canberra in February, 1956.



Maize Damage.

Seventy per cent. of the State's maize sowings comprised hybrids and a high average yield per acre was expected, but floods in all maize districts countered the effects of hybrid sowings.

(Photo from Grafton Office)

Food and Agriculture Organisation.

The State F.A.O. Committee has continued to maintain close liaison with the National F.A.O. Committee, and through that Committee with the headquarters of the United Nations Food and Agriculture Organisation in Rome.

The State F.A.O. Committee and the Department have continued to support F.A.O.'s Expanded Programme of Technical Assistance to underdeveloped countries, and several Departmental and retired officers were active in the programme. The Department has also assisted in training agricultural students and government officers from various Asian and Southern European countries.

Wheat Stabilisation.

For the first time since wheat price stabilisation was introduced the average return for wheat on export markets has fallen below the official cost of production. Unless there is a marked improvement in wheat export markets during the latter part of the 1955-56 wheat year, it will be necessary to draw on the Wheat Stabilisation Fund to maintain the export wheat price guarantee given to growers. This guarantee ensures that growers will receive not less than cost of production for up to 100,000,000 bushels of wheat exported in any one season. Cost of production for the 1955-56 season is 13s. 1d. f.o.b., principal ports. It is anticipated that wheat exports in the current wheat year will exceed 100,000,000 bushels.

The current international wheat agreement is due to expire on July 31, 1956. Following protracted negotiations, agreement has been reached on the details of a new three-year agreement to replace the existing agreement which operated from August 1, 1953. However, the quantity of wheat to be covered by the new agreement is less than the quantity covered in the 1953 agreement, and it is not anticipated that the new agreement will have a significant effect on Australian trade in wheat.

It is expected that the quantity of wheat covered by the new agreement will be approximately 300,000,000 bushels, and that Australia's quota will be about 30,000,000 bushels; less than one-third of Australia's annual wheat exports.

Expenditure—Summary.

The net expenditure from Consolidated Revenue Fund on investigational, educational and associated administrative activities amounted to £1,460,033. This figure does not include the expenditure of £1,100,972 on tick eradication and control

£549,222, provided by the State and £551,750, contributed by the Commonwealth), nor the Botanic Gardens, Domain and Centennial Park, £109,455 gross (receipts £6,992).

Certain revenues collected by the Department and amounting to £508,760, exclusive of the revenue and receipts of the undertakings mentioned in the preceding paragraph, have been deducted from the gross expenditure to arrive at the net £1,460,033.

In addition, the Departmental expenditure from Loan Fund was £149,999.

Details of the accounts of the Department, including numerous Special Deposits Accounts, opened with the Treasury in terms of the Special Deposits Act of 1911, are presented in the Appendix I.

Capital Works.

The Department has in hand capital works such as building water supply, stock yards, etc., estimated to cost £115,000, complete in 1956-57. In addition to the works in hand, major improvements are essential at the Experiment Stations, the nature of buildings, water supply, fencing, etc., and the educational institutions of the Department, if the Department is to execute the research and educational works necessary to the well-being and development of the primary industries.

Flood Relief.

The disastrous floods which affected many parts of the State resulted in 967 applications by primary producers for flood relief. These claims were investigated by field officers of the Department. The Department has paid 423 claims made by householders, and 460 accounts for food, clothing, medical supplies, and transport. Expenditure from all sources on flood relief amounted to £473,510.

Farrer Memorial Trust.

The Trustees of the Farrer Memorial Research Scholarship Fund held an annual and two ordinary meetings.

The Annual Farrer Memorial Oration was given by E. A. Southee, O.B.E., M.A. (Oxon.), B.Sc., B.Sc.Agr. (Sydney F.L.S.). Mr. Southee was formerly Principal of Hawkesbury Agricultural College, a position which he held for thirty-three years. The Oration was delivered on the 12th July, 1955, at the Annual State Congress of the Agricultural Bureau of New South Wales at Hawkesbury Agricultural College. Mr. Southee was presented on behalf of the Trustees with

Farrer Memorial Medal for 1955 in recognition of his distinguished service in Agricultural Science. His Oration was on "Practice with Science", and the text was subsequently published in *The Agricultural Gazette of N.S.W.*

The Trust still has a Farrer Scholar, Mr. W. V. Single, overseas. He is undertaking in the United Kingdom advanced studies into frost damage in wheat. The tenure of his scholarship was recently extended for another year. Mr. Single is an officer of the N.S.W. Department of Agriculture and the experience and training gained will be of great benefit when he returns.

Botanic Gardens and Sydney Domain Trust.

The Trustees of the Botanic Gardens and Domain met on three occasions.

Requests continued to be received for the temporary or permanent alienation of portions of the Domain for purposes other than those relating to the full and free use of the Domain by the Public. During the year, the Government approved of the construction by the City Council of a car parking station on the Domain and this work is in progress. Portion of the Domain will also be affected by the decision to proceed with the roadway from Circular Quay.

Several prospective sites for an annexe to the Botanic Gardens, within the metropolitan area, were inspected and the matter is receiving further attention.

McGarvie Smith Institute.

An increasing range of vaccines is produced at the McGarvie Smith Institute. Many of the vaccines are sold also for use overseas.

In accordance with the McGarvie Smith Institute Incorporation Act, 1928, profits from the sale of vaccines are applied to the promotion and advancement of veterinary education and research. The financial position of the Institute is satisfactory.

Agricultural Regions.

The establishment of another Region, to be known as the South Western Region, with headquarters at Leeton, has been determined. It will include the Murrumbidgee Irrigation areas and will extend to the Murray River in the south and to the Western Division Boundary in the west. It will be in operation by 1st November, 1956.

Consideration is being given to the establishment of another Region, early in 1957, to include the Tamworth, Armidale, Glen Innes, Tenterfield, and Inverell districts.

In a later section of this Report under the heading "Regional Extension Services", the activities of the established Western, Southern, Far North Coast, and South Coast and Tablelands Regions are reported in some detail.

Co-ordinated Extension Services.

The Co-ordinated Extension Services, inaugurated in December, 1952, continued to function. This scheme had its origin in a decision by the Food Production Committee of New South Wales requiring co-ordination of the field officers of the Department of Agriculture, the Rural Bank, the New South Wales Milk Board, and the Soil Conservation Service, in the provision of agricultural advisory services to farmers.

There are 330 field personnel operating in the Co-ordinated Extension Services. The scheme is reported in more detail in a later section of this Report.

Agricultural Extension Grant.

The Commonwealth Government made available the sum of 200,000 p.a. to the States in 1952-53 to be expended on agricultural advisory services. The amount allocated to New South Wales was £50,000, which sum was increased, as a result of an additional allocation by the Commonwealth, to 75,000 for 1955-56. The Grant will continue until 1960, prior to which year a determination will be made as to whether it will then be discontinued or extended for a further period.

Projects dealing with pastures, crops, irrigation, livestock, horticulture, weeds, insect pests, and diseases, and other features of agriculture are current in New South Wales. Funds have been used also for the production of agricultural films, development of library services, appointment of agricultural trainees at Universities and Colleges, provision of extension aids to officers, and appointment of publicity officers, in the regions, editorial assistants, and field assistants.

There are more details of the effects of this Grant later in this Report.

Country Killing.

Construction of the Gunnedah Abattoir is proceeding according to schedule. This abattoir is expected to commence operations about the middle of 1957.

The first central abattoir to be appointed under the Cattle Slaughtering and Diseased Animals and Meat (Amendment) Act, 1953, commenced operations on 16th January, 1956. It caters for the Municipality of Cooma.

Homebush Abattoir.

The foundation stone of the new Country Meat Hall at the Homebush Abattoir was laid by the Minister for Agriculture and Food Production on 30th November, 1955. This large building is expected to be completed before the end of 1956. It will enable the effective handling of carcasses brought into the metropolitan area from country abattoirs, so that the country-killed meat will have the same advantages of display, for buyers, as that slaughtered in Sydney.

Meat Inspection Service.

The Meat Inspection Service continued to fulfil its main function, viz., inspection to ensure disease-free meat for the Sydney metropolitan area. The trial co-operative scheme as between Commonwealth and State which was commenced at the State Abattoir, Homebush, in February, 1955, is continuing.

Detail of the Meat Inspection Service is provided later in this Report, under "Division of Animal Industry".

Cattle Tick Eradication.

This was an auspicious year in the activities of the Board of Tick Control. The first six months were spent in preparation for the Eradication Campaign which commenced in January, 1956, and included the Tick Quarantine Areas of Kyogle, Woodenbong, Benalbo, Tabulam, Cheviot, Southern Rivertree, Bookookooara and in March, 1956, Cullendore. The area undergoing eradication treatment is of some 2,000 square miles, and contains approximately 200,000 head of cattle and 7,000 horses. The tick eradication programme envisages dipping of all stock at fortnightly intervals, for thirty-two dippings, in a DDT preparation. Of the thirty-two rounds, thirteen have been completed.

Areas where the nature of the country rendered the complete muster of all stock impracticable, have been leased by the Department; involving some 400,000 acres at a cost of £232,000.

The work of the Board of Tick Control and Queensland Border Control are reported in detail under "Division of Animal Industry".

Rabbit Myxomatosis.

Myxomatosis continued to maintain a satisfactory degree of virulence in the sparse rabbit population of the State, and at the close of the year it could be fairly claimed that the rabbit population is at an all-time low. There are still a few places where rabbits can be seen in reasonable numbers. These are above the 4,000 feet altitude of the Australian Alps, and in the Wilcannia and Broken Hill districts.

The "Glenfield" strain of the virus has been maintained at full virulence, and supplies have been available to Pastures Protection Boards and stockowners throughout the year. Some 188,000 doses of virus were despatched on request, as against 250,000 in the previous year. The decrease was expected, since many districts were free of rabbits.

Poultry Industry Efficiency.

A plan recommended by the Conference of Commonwealth and State Officers and adopted by the Agricultural Council during 1955, to improve the genotype of Australian strains of poultry, is being successfully implemented in New South Wales. The Poultry Experiment Station at Seven Hills will produce foundation stock; and the Poultry Section at Hawkesbury Agricultural College has been made a demonstration breeding farm, producing improved strains of White Leghorns and Australorps. The College will also measure the degree of improvement by Random Sample Testing of approved breeders' stock.

Chickens from selected breeding lines will be available for approved breeders and multipliers during 1957. Fifteen private breeders, representing a major section of the poultry industry, are breeding in accordance with the rules governing this scheme.

The New South Wales Poultry Improvement Plan (Eggs) has been accepted by all poultry industry associations. It is the most forward step so far taken to promote poultry industry efficiency.

Swine Branding Act, 1940.

The Swine Branding Act, 1940, was brought into force on 1st July, 1955, and has operated satisfactorily during the year. Approximately 2,500 farms of origin of diseased carcasses have been identified, and appropriate remedial steps have been taken to deal with cases of tubercular infection.

Swine Compensation Fund.

The Swine Compensation Fund set up under the Swine Compensation Act, 1928-35, is now in a healthy financial position after some years of indebtedness to the Treasury. The operation of the Swine Branding Act, 1940, has played a part in improving the Fund finances.

Stud Stock Buying Delegation.

The Overseas Stud Stock Buying Delegation led by the Hon. E. H. Graham, Minister for Agriculture and Food Production, visited the United Kingdom, certain European countries, the United States of America, and Canada. Dairy and beef breeds of cattle and an Arab stallion were purchased. The animals, which have arrived in Australia, will be posted to the various Departmental Studs and to artificial insemination centres. The respective livestock industries are destined to derive great benefit from these carefully selected blood lines.

Royal Easter Show—Livestock Successes.

Exhibits from Departmental Studs enjoyed outstanding successes at the N.S.W. Royal Agricultural Society's 1956 Show. The recently founded Poll Shorthorn Stud at Wagga Agricultural College marked its entry into competitive classes at the Sydney Royal by taking the Supreme Championship of the breed. In the Aberdeen Angus Section the Department gained the Supreme Championship with a bull of its own breeding, for the second successive year. The Department's Arab horses gained signal success. There are five competitive classes in this Section and all were won by Departmental entries which also secured the mare and stallion Championships. This run of success was continued in the Goat Section, in which Departmental exhibits gained both breed Championships, viz., the Saanen and any other dairy breed (Toggenburg).

War Service Land Settlement.

The financial agreement now existing between the Commonwealth and State Governments on War Service Land Settlement work, together with the recent amendments to the War Service Land Settlement Act, enabling fair market value to be paid for land, have led to a large increase in volume of work.

It was found necessary to re-establish a full-time officer for War Service Land Settlement work, so that utmost co-operation could be given to the Department of Lands in the settlement of ex-servicemen on the land with minimum delay. The activities are reported in detail under "Division of Plant Industry".

Small Irrigation.

With the great increase in the extent of the practice of spray irrigation and irrigation by flooding from rivers, creeks, or farm excavated storages, the need for further irrigation research has been intensified. The Department has taken steps to meet the need, by setting up an Inter-Departmental Committee, including Water Conservation and Irrigation Commission representation, to plan irrigation research work. It is intended to establish a research centre at Yanco Experiment Farm which has the facilities for spray and flood irrigation.

Fodder Conservation Scheme.

Advances under the State Fodder Conservation Scheme were made to 137 farmers, and totalled £69,235, a substantial increase on the previous year.

The post-war trend to mechanise fodder conservation has continued; and the use of metal grain silos for storage of grain as a supplementary feed is now common practice. Though figures are not available, indications are that there is now more fodder stored on farms than at any previous period. This may not be sufficient to meet all emergencies but is nevertheless a pleasing trend.

Research/Extension Advisory Committee.

Meetings of the Research/Extension Committee have been convened to consider research projects and establish priorities.

Advisory Committee on Co-ordination of Agricultural Research.

Meetings of the A.C.C.A.R. were held, and gave attention to the proposal of the Trustees of the C. B. Alexander Estate that an Agricultural College should be established at "Tocal" Paterson, in the Hunter River district, and to the technical work conducted at the Fowler's Gap Rural Investigation Station.

Dairy Factory Apprenticeship Scheme.

The "Butter, etc., Factory Employees' Apprenticeship Scheme" was launched. Seventeen apprentices were indentured to different factories. Six of them entered the fourth year of apprenticeship and were eligible for admission to the Diploma Course at the School of Dairy Technology at Hawkesbury Agricultural College. During their period of training at the College the apprentices will receive £300 per year from the fund established by donations from representatives of the dairying industry, private banks, manufacturers of dairy produce machinery, and other commercial interests. Eleven apprentices are engaged in factories, and schools of training have already been held.

New Dairy Produce Factory, Hawkesbury College.

The new Dairy Produce Factory at Hawkesbury College was officially opened by the Honourable the Minister for Agriculture and Food Production, Mr. E. H. Graham, M.L.A., on 27th October, 1955.

The factory is equipped to manufacture cheese, butter, ice cream, condensed milk, spray and roller dried powdered milk and also to pasteurise and bottle milk for consumption in the neighbouring towns.

Equipment of the most modern kind, in the laboratories and the factory, is now available for student training in dairy technology.

Dairy Industry Extension Grant.

Sixty-four thousand eight hundred and seventy nine pounds (£64,879) was made available by the Commonwealth Government for the third year of the second five-year period (1953-58) for promotion of improved practices in the dairying industry of New South Wales.

The Grant was expended on the following projects:—Gradual herd recording, herd wastage and sire surveys, farm demonstrations of improved pastures and silage making, artificial stock breeding station at Berry, purchase of bulls for Berry general publicity, purchase of punch card equipment, and salaries of organising officers and the staff engaged on statistical work. Further details of the activities financed by this Grant are reported under "Division of Dairying".

Artificial Stock Breeding Station, Berry.

The Centre was established in 1952 to show that artificial stock breeding could be introduced into New South Wales on a commercial basis.

The commercial activities of the Station were handed over to the Milk Board of New South Wales in February, 1956, and the Centre is now under the control of that Board.

Officers of the Department will continue to act in an advisory capacity in the purchase of bulls for the Centre, and in research and other technical aspects. The activities of the Station are further reported under "Division of Animal Industry".

Fruit Fly.

An outbreak of fruit fly for the second year in succession in the M.I.A., with consequent loss of the New Zealand citrus export trade again this season, has been a matter of serious concern to the growers in the M.I.A. and the New South Wales citrus industry as a whole.

During the 1954 "clean up" of fruit fly in this area, certain difficulties were encountered in the enforcement of the Irrigation Act. Consequently, on the occasion of this year's outbreak, enforcement of the measures for fruit fly control in the M.I.A. was undertaken under the provisions of the Plant Diseases Act.

Fortunately, no fruit fly was found at Barham this season; thus the mid-Murray growers were able to resume their New Zealand export trade.

The fruit fly campaigns, and research work, are reported further under "Division of Horticulture" and "Division of Science Services—Entomological Branch".

Agricultural Education.

The total student enrolment at Hawkesbury Agricultural College is 233 which is the highest enrolment ever recorded at the College. There continues to be a heavy demand for places at the College.

At Wagga Agricultural College the enrolment is the maximum which can be accommodated, namely seventy-five. A programme of construction being carried out there at the present time will in due course permit a further increase in student accommodation.

The demand from farmers for short-term schools at both Hawkesbury and Wagga Agricultural Colleges continues on a high level and schools were conducted in Dairy Farming, Poultry Farming, Tractor Maintenance, Turkey Raising and Beekeeping. Short-term schools were conducted also at certain Experiment Farms and at other suitable centres in country districts.

The two Agricultural Colleges are reported in detail in a later section, respectively, of this Report.

Experiment Farms and Stations Branch.

Technical Contributions.—The Departmental Farms', Stations', and sub-Stations' contributions to research and experimentation in the agronomy, plant breeding, fruit industry, and livestock fields; the livestock studs; pure-seed production activities; and the contributions to extension service through short-term schools, field days, demonstrations, and farmer visits, are incorporated in the sectional reports (herein) of respective Divisions:—Plant Industry, Horticulture, Animal Industry, Dairying, and Science Services.

Staffing.—The staffing position at Experiment Farms and Stations has been acute for some years but has greatly improved during the past twelve months. Twelve of the sixteen Farms now have experienced, professional officers as Managers and four are under the control of similar personnel acting as officer-in-charge.

Buildings.—Additional accommodation has been provided at Yanco Experiment Farm by extensive alterations to the quarters. The improved accommodation facilitated the holding of four extension schools for farmers during the past year.

Alterations have been made to the former "student quarters" block at Wollongbar Farm and the office. Thus, laboratory accommodation has been provided for the Department's animal nutrition research team and for the Departmental/University of Sydney pastures and plant nutrition team working on the North Coast.

Development.—Extensive erosion control works have been completed at Tamworth Agricultural Experiment Station and at New England Experiment Farm. Much remains to be done in this direction at both Farms and will be achieved as funds become available.

Farm Managers have been busy on fencing matters. A sum of £4,000 from 1955-56 funds was spent on fencing materials.

Sheep yards have been erected at Condobolin Experiment Farm, where an extensive fencing programme has also been undertaken. Those will facilitate the comprehensive series of rotational, nutritional, and drought feeding trials which are to be commenced at Condobolin.

On the Lower Murray Research Station an overhead spray irrigation system has been installed. The Main Roads Department has been unable to carry out the programme of internal roads building, gravelling and sealing, on the Lower Murray Research Station, because of the floods, but this work will be completed during 1956-57.

At the Tamworth and Trangie Agricultural Experiment Stations pre-fabricated hay sheds have been erected.

* *Farm Machinery and Equipment.*—The sum of £10,000 was allocated by the Treasury for the purchase of machinery for Experiment Farms. The major items purchased with this money were:—

Grafton Experiment Farm: a Ferguson tractor, a hammer mill, and tandem disc harrows.

† 67023—2

Tamworth Agricultural Experiment Station: a power take-off baler, and a mower.

Trangie Agricultural Experiment Station: a sundercut, a combine, a side delivery rake, and platform scales.

Condobolin Experiment Farm: a combine, and a disc plough.

New England Experiment Farm: offset disc harrows, and a combine.

Wollongbar Experiment Farm: Avery scales.

Gosford Citrus Experiment Station: a kerosene engine.

Lower Murray Research Station: a 9-hoe drill.

Yanco Experiment Farm: a pH meter.

After payment for the above items, and for items ordered in 1954-55 and delivered in 1955-56, the remnant was spent on minor items ranging in value up to £60.

Equipment on Experiment Farms is gradually being built up or restored to a level at which expected experiment and routine farm work can proceed efficiently. Many major items of machinery were purchased ten or more years ago. Their retention and repair are uneconomic and affecting the efficiency of the institutions.

Machinery Testing.—During the year new types of farm machinery, some devised and made locally and others imported from America and England, have been tested in co-operation with the Commonwealth Department of Primary Industry. New, local types of chisel plough have been tested for farm work, as well as for serrated tussock control in particular. Local and imported sod seeders, an imported grass sprig planter, and local and imported turbo types of orchard and entomological units are among the machines under test.

Legal and Registration Branch.

LEGISLATION.

Dairy Industry (Amendment) Act, 1955.—The only legislation passed during the year was an Act to amend the Dairy Industry Act, 1915-1951, with respect to the manufacture of table margarine. The Act prohibits the manufacture of table margarine except under licence issued by the Minister and the amending legislation increased the total quantity of margarine for which licences could be issued from 2,500 tons to 9,000 tons.

Marketing of Primary Products (Amendment) Bill, 1955.—A Bill was introduced to amend the Marketing of Primary Products Act, 1927-1940, to remove legal doubt as to the power to make regulations under the Act, to confer additional powers on marketing boards and to validate a financial arrangement of the Egg Marketing Board, but Parliament was dissolved before the Bill was passed.

REGULATIONS, PROCLAMATIONS, ETC.

The number of regulations and notifications was 30 and 66 respectively, approximately the same as the previous year; while proclamations increased from 45 in the previous year, to 70. The proclamations were of a machinery nature. The regulations were, for the most part, of a machinery nature.

Provision was made for 1½-inch mesh netting to continue as the prescribed netting for rabbit-proof fencing.

Important amendments were made to the by-laws of the Domain and the regulations governing Centennial Park, in regard to the size of vehicles and the speed limit within those areas.

PROSECUTIONS.

There were 153 informations issued, as compared with 124 in the previous year. A large proportion of the prosecutions were under the Plant Diseases Act, 1929, and the Stock Diseases Act, 1923-1934. In the former case, they were mainly in connection with failure to take measures for control of disease and failure to comply with grading regulations with respect to the marketing of fruit and vegetables. In the latter case they were for offences in connection with the handling of diseased stock.

Prosecutions were also taken under a number of other Acts, including the Potato Growers Licensing Act, Agricultural Seeds Act, and Meat Industry Act.

ARBITRATION UNDER THE AGRICULTURAL HOLDINGS ACT, 1941.

Only two disputes were referred to Arbitration, one being a claim for compensation for improvements and the other a claim for improvements and for compensation for disturbance of tenancy.

REGISTRATIONS.

The registrations effected during 1955-56, compared with those of 1954-1955, are tabulated. The Swine Branding Act came into operation early in 1955 and the bulk of brands registered under the Act were registered before 30th June, 1955. The additional 2,852 registered during the 1955-1956 period are the remainder of registrations consequent upon the bringing of the Act into operation.

	1954-1955.	1955-1956.
Apiary Registrations	3,902	3,853
Potato Licences	1,535	1,548
Stock Foods	800	896
Stock Medicines	1,249	1,347
Pest Destroyers	1,012	1,087
Sheep Brands	3,216	2,439
Sheep Earmarks	3,373	2,662
Large Stock Brands	2,235	2,005
Fertilizers	383	369
Farm Produce Agents	304	304
Veterinary Surgeons	365	374
Swine Brands	10,037	2,852
Swine Licences	119	269

Veterinary Surgeons' Board.

Eleven meetings were held. The business was confined to the routine matters of registration and deregistration, and supervision of the activities of those engaged in veterinary practice. The prescribed examination for veterinary graduates of overseas Universities was held in September, 1955. Two of the four examinees were successful and were subsequently granted registration. Since the enactment of the special legislation in 1952, 19 graduates have qualified for registration under the legislation.

Personnel Section.

The attractiveness of traineeships tenable at the University and of cadetships at the Hawkesbury and Wagga Agricultural Colleges resulted in increased inquiries. "Professional Careers in Agriculture" displays, and the Department's brochure on such careers have helped to stimulate the evident interest.

An increased number of Fellows under the Colombo Plan and F.A.O. Plan received training and tuition in the Department and at various country centres.

A notable feature of this work was group training of 15 Indian farmers. In order that they might gain some knowledge of the Australian way of life, arrangements were made for them to be accommodated with Australian farmers in the Murrumbidgee Areas and to undertake and perform work on the properties. This innovation was considered a success by the Indian farmers and their Australian hosts.

Departmental officers in country centres have all reported favourably on the type of Fellow visiting their district. Discussions between the visitors and the Departmental officers have been to mutual advantage.

In preparation for Departmental examinations, tutorial classes were organised for examinations under Regulations 116 and 119. Examinations were also conducted under Regulations 124 for field officers, and for Plant Diseases Act inspectors.

A number of University students were given vocational employment under Ministerial authority in the Argentine Ant Eradication Campaign. They again proved keen and enthusiastic in the performance of duties associated with surveying and spraying of infested suburban properties.

Plans and working drawings were completed by the Department of Public Works for the new building to be erected in Wagga to accommodate officers of this Department and the Department of Education. A contract was also let by the Works Department for construction of two storeys, ground and first floors, as the first stage in erection of the projected four-storey building at Wagga.

Housing accommodation was secured through the New South Wales Government Real Estate Office for several Departmental officers who were adversely housed in various country centres.

Staff Changes.

Appointments.—Messrs. B. D. Ament, Special Agronomist; J. W. Boyle, Special Agronomist (Land Settlement); E. W. Bowmaker, Special Agronomist (Irrigation); E. H. Headley, Principal Dairy Officer; J. D. Colwell, Senior Research Officer, A.R.I., Wagga (Soil); Dr. F. C. Butler, Senior Research Officer, A.R.I., Wagga (Plant Path.); J. L. Gregg, Senior Research Officer, A.R.I., Wagga (Gen. Chem.); A. K. Powrie,

Senior Research Officer, A.R.I., Wagga (Agronomy); G. A. Crawford, Agric. Organiser, M.I.A.; W. J. C. Hudson, Manager, Woonongbar Farm; C. R. Hood, Manager, Leeton Farm; F. D. McKenzie, Manager, Temora Farm; E. J. H. McBarron, Special Veterinary Research Officer.

Retirements.—Dr. H. G. Belschner, Emergency Chief, Division of Plant Industry.

Deaths.—H. L. Manuel, Principal Fruit Officer (Viticulture).

Returned from Overseas.—The Hon. E. H. Graham, Minister for Agriculture and Food Production; Messrs. G. McGillivray, Chief, Division of Dairying; J. B. Murphy, Principal Livestock Officer (Beef Cattle); and P. S. Hill, Minister's Secretary; from United Kingdom and America as a stock purchasing delegation.

Mr. P. R. Druitt, Agronomist, from study in the United States of America and the United Kingdom.

Mr. J. N. Potter, Assistant Organiser, Agricultural Bureau, from United Kingdom and European Countries on study leave without pay.

Officers Overseas.—Mr. A. E. Wilson, Landscape Gardener, on private visit to Italy, France, England, Switzerland, Scandinavia, and Netherlands, to study landscape gardening.

Mr. B. P. Setchell, Veterinary Officer, to United Kingdom, under Walter and Eliza Hall Scholarship.

Mr. J. E. Hunt, Inspector, Plant Diseases Act, to Iraq, to serve as a machinery expert with United Nations Food and Agriculture Organisation.

Mr. W. V. Single, Agronomist, to London, under Farrer Memorial Scholarship.

Mr. R. R. Storrier, Analyst, to London, under Thomas Lawrence Pawlett Scholarship.

Mr. R. Layland, Laboratory Assistant, to take up position of laboratory technician with Government of North Borneo, under the Colombo Plan.

Mr. B. F. Davey, Analyst, to Scotland, under Thomas Lawrence Pawlett Scholarship (extended from 1954).

Dr. T. B. Kiely, Plant Pathologist, to Ceylon, as an adviser in citrus cultivation, under the Colombo Plan.

Miss A. I. M. Myers, Seeds Officer, to Paris, as Rules Member and Australian Delegate, and to the United Kingdom, in connection with seed-testing work.

Number of Staff at 30th June, 1956.

	Public Service Board.	Ministerial.	Total
Central Administration	278	...	278
Division of Information and Extension Services	31	...	31
Division of Marketing and Agricultural Economics.....	32	...	32
Division of Science Services ...	97	...	97
Division of Plant Industry	190	...	190
Division of Dairying	165	...	165
Division of Horticulture	130	...	130
Division of Animal Industry—			
Head and District Offices	203	13	216
Meat Inspection Service ...	105	13	118
Queensland and Border.....	38	...	38
Tick Quarantine Areas	35	755	790
Hawkesbury Agricultural College	44	67	111
Wagga Agricultural College	22	44	66
Experiment Farms and Nurseries	138	220	358
Botanic Gardens.....	119	3	122
	1,627	1,115	2,742

Architect Branch.

Loan Funds and Consolidated Revenue Funds expanded on new works and maintenance were as follows:—

	£
Loan Funds	149,999
C.R. Funds, and including Western Division	
Public Watering Places Fund	52,895

Works Completed.—New horse yards and shearing shed and yards at the Hawkesbury Agricultural College; dormitory block, eight cottages, residence for the Director of the Agricultural Research Institute, and a septic tank installation to



Aircraft v. The Plague Locust.

When complete control of the Australian Plague Locust (*Chortoicetes terminifera*) in the south-western outbreaks was hampered by the wet seasonal conditions, the Department effectively employed light aircraft to deal with the flying swarms as they arose.

(Photo from head office library).

sewer five residences, at the Wagga Agricultural College and Experiment Station; installation of domestic and irrigation water supply and construction of roads at the Lower Murray Research Station; a cottage on the Queensland Border at Riverton; glasshouses at Grafton Experiment Farm, Hawkesbury Agricultural College, Bathurst Experiment Farm and the Botanic Gardens; hay sheds at Tamworth Agricultural Experiment Station and at Trangie Agricultural Experiment Station; and a new bore at Wanaaring.

Work Still Proceeding.—Dairy Technology School at the Hawkesbury Agricultural College; new administration buildings, stewards' and officers' quarters and dining room, Research Institute, and College Oval, at the Wagga Agricultural College and Experiment Station.

New Works Commenced.—In course of construction are: bull sheds and yards at the Hawkesbury Agricultural College; bull sheds and yards at the Wagga Agricultural College and Experiment Station.

Maintenance Work.—Painting and repairs to cottages and farm buildings at Seven Hills Poultry Experiment Station, Glenfield Veterinary Research Station, Wollongbar Experiment Farm, Grafton Experiment Farm; and Trangie Agricultural Experiment Station, and Queensland Border Control; a new bore in the Wanaaring district, and desilting, etc., of tanks on the Public Watering Places in the Western Division of the State.

Extension Service.—Many inquiries concerning farm building problems were attended to by letter or personal interview. Plans representing farm buildings to the value of £190,670 were supplied to farmers.

Pastures Protection Section.

Grasshopper Control Campaign.—The plague locust infestation over the main part of the Central Division had almost disappeared by spring, 1955; but fresh and very dense hatchings occurred in the south-west, mainly in Hay and Hillston Pastures Protection Board Districts. Advance warning was given by Entomological Branch. In preparation, all insecticide left from the Central Division campaign, and the equipment purchased from the Grasshopper Destruction Levy, were transferred to the south-west. Demonstrations were conducted at various centres when the hatchings were noted.

Three experienced officers were seconded from northern Boards. They, with Departmental officers, advised the south-western Boards on organization and control methods, and took an active part.

Despite the very wet season, lush growth, and many paddocks so wet and boggy that motor transport could not be used, many swarms at the "hopper" stage were wiped out. Even some very large properties achieved complete control over the hatchings.

Shire authorities co-operated and made determined efforts to treat swarms coming out on to the roads. Local government effort was of a high order.

When complete control was not achieved under the seasonal conditions the Department employed Tiger Moth aircraft to deal with flying swarms as they arose and as close as possible to their place of origin; to prevent significant swarms from crossing the Lachlan River, and to prevent heavy infestation of the Murrumbidgee Irrigation Areas. This project succeeded. Only small local swarms of fliers affected the M.I.A. Later the planes moved to Jerilderie to deal with flying swarms which had crossed the Murrumbidgee river.

The campaign provided a great deal of information regarding control of hopper swarms in sparsely settled areas, movement of flying swarms, and use of aircraft. Moreover, the equipment in general demonstrated to landholders what success could be achieved with modern aids.

After the campaign, which had covered 1953, 1954, and 1955, the Chief Entomologist considered negligible the likelihood of outbreaks of any consequence in 1956. Therefore the equipment purchased from the Noxious Insects Funds, thirteen Wilbists and ten Boom Sprays, will be sold. The equipment has been used for three seasons, by many Boards. It shows normal wear and tear and the affects of transport between districts.

Also on hand after the campaign were approximately 20,000 gallons of BHC and 1,000 gallons of aldrin; 10,000 gallons of BHC and 1,000 gallons of aldrin will be offered for sale.

Rabbits.—Because of the succession of good seasons and the heavy growth of grass and herbage, it has been difficult to assess the rabbit population in many areas; but rabbit inspectors have persevered with myxomatosis inoculations. However, since myxomatosis potency may decline, Pastures Protection Boards are intensifying their efforts to enforce the use of conventional methods of rabbit eradication by landholders.

Licences to Keep Rabbits for Fur Farming.—Eighteen licences were granted, compared with eight in the preceding year.

Dingo Destruction Boards.—The arrangement whereby the Department subsidises Dingo Destruction Boards to the extent of 50 per cent. of rates collected, now assures the Boards

of a set sum of money on which to plan their operations for the ensuing year. This has given Boards greater confidence in planning.

Aerial baiting is being seriously considered by two Dingo Destruction Boards and will be tried in the near future.

The Lower North Coast and Tablelands Dingo Destruction Board is planning to encourage the establishment of Native Dog Associations and as an inducement is offering to supply

traps at a nominal rate, with prepared poison baits free and, in addition to the ordinary bonus, to give £1 for each scalp taken by members of Native Dog Associations. This Board has also proposed a conference of all Dingo Destruction Boards in the State with a view to improved methods of dingo destruction.

The following statistics relate to the activities of the four Dingo Destruction Boards operating under the Pastures Protection Act:—

Board.	Subsidies.		Scalps.		Scalp Bonus.				Levy per acre.	
	12 months ended.		12 months ended.		1954.		1955.		1954.	1955.
	30th June, 1955.	30th June, 1956.	31st Dec., 1954.	31st Dec., 1955.	Dogs.	Pups.	Dogs.	Pups.		
	£	£	No.	No.	£	£	£	£		
North Coast and Tablelands	2,914	1,600	2,012	1,758	3	1½	3	1½	1d.	½d.
Lower North Coast and Tablelands.....	315	1,763	1,030	976	3	1½	3	1½	½d.	½d.
Central Tablelands and Hunter	273	137	100	114	3	1½	3	1½	½d.	*
Southern Tablelands	1,493	1,500	242†	212	4	2	4	2	2d.	1½d.
Total... ..	£4,995	£5,000	3,384	3,060						

* This Board levied on an arbitrary basis during 1955. Three of the component Pastures Protection Boards paid £105 each, two paid £89 10s. 0d. each and one paid £52 10s. 0d.
† 18 months ended 31st December, 1954.

Revocation or Curtailment of Travelling Stock Reserves.—The Pastures Protection Section (Amendment) Act, 1951, included a provision enabling Travelling Stock Reserves or parts thereof to be withdrawn from the control of the Pastures Protection Boards on the recommendation of the Minister of this Department. Applications for revocations of parts or the whole of Travelling Stock Reserves handled from 7th December, 1951 to 30th June, 1955, totalled 1,822. During 1955/56 a further 339 cases were received. Cases dealt with up to 30th June, 1956 and the acreage involved may be summarised as follows:—

	Reserves.	Acreage.
1. Recommended for withdrawal with consent of Pastures Protection Boards	1,137	64,858 (i)
2. Recommended for withdrawal without consent of Boards	96	12,495
3. Referred to Land Board by Minister, for inquiry, but not yet completed	2	16
4. Referred to Land Board by Minister, for inquiry— (a) Land Board recommended part revocation (b) Land Board recommended against revocation	4 1	703 12
5. Boards not agreeable to revocation— (a) Investigation upheld Boards' decisions..... (b) Investigation reveals revocation may be possible	214 12	28,469 (ii) 3,048
(c) Awaiting investigation	636	51,083 (iii)
Awaiting replies from Boards as to whether or not they are agreeable to revocation	59	2,321 (iv)
	2,161	163,005

(i) This figure excludes the unknown acreage of 218 Reserves.
(ii) This figure excludes the unknown acreage of 24 Reserves.
(iii) This figure excludes the unknown acreage of 221 Reserves.
(iv) This figure excludes the unknown acreage of 80 Reserves.

In 1950 the Boards were requested to survey the Reserves in their districts and advise as to which would be surplus. As a result, and prior to the amendment of the Act in December, 1951, fourteen Boards advised that they were agreeable to relinquish 128 Reserves or parts thereof. The acreage involved in these cases totalled more than 15,000 acres.

The following figures indicate the position in regard to Reserves during the years ended 30th June, 1955 and 30th June, 1956:—

Period.	No. of Reserve Applications Received.	No. of Reserve Applications Rejected by Boards.	No. of Reserves Investigated.
1st July, 1954 to 30th June, 1955	461	221	122
1st July, 1955 to 30th June, 1956	339	148	144

The Pastures Protection field officer was unable to give undivided attention to the inspection of Reserves, owing to his directing field activities in the grasshopper control campaign. When the campaign concluded in December, 1955, he gave almost undivided attention to the inspection of Reserves up to 30th June, 1956. In that period approximately ninety Reserves were inspected, in seven Pastures Protection Districts, making a total of 144 Reserves inspected and reported upon during the twelve months.

The procedure for referring to each Board details of the field officer's report on the various reserves in their district has been improved. The field officer now confers with the Chairman and officers of each Board at the conclusion of his inspections in their district. He furnishes details of the results of his investigations and discusses the reasons for and against the revocation of the whole or part of each Reserve.

Thus the Boards have the opportunity to discuss each case at the subsequent meeting, prior to a recommendation being made to the Minister. They have a clearer understanding of the reasons for recommendations made by the field officer for reduction of any areas under their control. As a result the Boards' concern in about 90 per cent. of cases. In the remainder it is sometimes possible to make further inspections to clarify points at issue.

Leases of Public Watering Places.—The only leases of Western Division Public Watering Places to expire were in the Walgett North Pastures Protection District, and Ministerial approval was given to the Board to grant leases over twelve Public Watering Places in that District.

Public Watering Places.	Year ended 30th June, 1955.	Year ended 30th June, 1956.
(a) Established	4	4
(b) Revoked.....	4	10
(c) Revoked and re-established as amended area	9	14

(a) Includes 1 P.W.P. also notified as a Town Water Supply.
(b) Includes 3 P.W.P.'s also revoked as Town Water Supplies.
(c) Includes 2 P.W.P.'s also re-established as Town Water Supplies.

Stock Inspectors' Award.—Increased salaries were provided for stock inspectors by a variation of the Stock Inspectors Award effective from 1st January, 1956.

Industrial Agreement covering Pastures Protection Board Secretaries.—In February, 1956, following an application made by the Association of Pastures Protection Board Secretaries

to the Department of Labour and Industry, a Pastures Protection Boards Secretaries (State) Conciliation Committee was established by the Minister for Labour and Industry, to introduce an industrial agreement under which secretaries are to be employed. The Conciliation Committee consists of two representatives of the Council of Advice to Pastures Protection Boards and two representatives of the Association of Pastures Protection Board Secretaries.

Until such time as an industrial agreement is determined by the Conciliation Committee, the existing agreement between the Minister for Agriculture and Food Production and two representatives each of the Council of Advice to Pastures Protection Boards and the Association of Pastures Protection Board Secretaries, will continue.

Biometrical Branch.

This Branch specialises in methods-research, and advice to other sections of the Department on design of experiments. The service includes the critical statistical analyses of the results of experiments, to assess the significance or reliability of the conclusions.

Punch-card System for Dairy Herd Recording.—A punch-card office-system for maintaining the extensive records accumulating from Dairy Herd Recording was undertaken this year. Production records from cows completing lactation from July 1st, 1955, onwards, are being punched into cards.

The individual milk and butterfat production of some 50,000 to 60,000 cows are taken by herd recording officers of the Division of Dairying once each month throughout each cow's lactation. The records have previously been maintained manually. In addition to immediate value to farmers these records have an important potential value for several purposes and in particular for sire survey.

Adoption of punch-card recording will yield economy in staff and speed in office summarisation. Because of ready accessibility and ease of handling, the records will also be used for essential research not otherwise readily possible.

DIVISION OF PLANT INDUSTRY.

General.

The general, agricultural expansion was again indicated by the increased areas sown to pastures in this State. These have now reached 7,000,000 acres, and current rate of increase is nearing 1,000,000 acres per year.

Such development does not occur without creating problems, in the solution of which this Division must assist. Where the answers are known, the Departmental extension officers demonstrate the best available methods. Such demonstrational work has expanded, with heavy demands on this Division's field staff. In addition, increasing demands have been made on personnel for lectures and demonstrations at short-term schools for farmers held at the agricultural colleges and in various rural localities. Staff numbers are up to the approved establishment, but still the number of trained personnel is inadequate to meet all such demands.

This year the number of demonstrations conducted under the Agricultural Extension Grant in co-operation with farmers almost doubled. A critically important set of demonstrations has been established to impress on farmers the role of improved pastures in controlling serrated tussock, now considered the State's most serious weed and a threat to the maintenance of existing stock numbers. A research agronomist has been allocated, to further investigate the control of this menace.

In view of the great increase in areas, almost 100 per cent. which will be under irrigation in the next ten years, greater emphasis is being placed on the training of personnel to advise on irrigation agriculture.

The use of Keepit Dam waters poses a special problem because of the greater cost of the water and the different climatic conditions in this north-western irrigation area. Accordingly the possibility of cotton growing is being investigated, and cotton growing in Queensland has been examined by representatives of this Department and the Water Conservation and Irrigation Commission, with a view to establishment of the crop in the north-west.

Agronomists.—A valuable service has been rendered by the Division's subject-matter specialists, disseminating up-to-date information, from projects and current literature, in monthly and quarterly roneoed statements to field officers and certain others. The selective circulation has ranged from 300 to 450 copies per issue.

There are thirty-three agronomists' districts, but during the year those with headquarters at Parkes, Parramatta, Inverell, Orange, East Maitland, Murwillumbah and Bega were vacant for periods, due to staff shortages. At present the Bega and Murwillumbah districts are without the services of a full-time district agronomist. In addition, the Coonabarabran, Forbes, Cowra, and Bathurst centres, previously headquarters of districts, have been temporarily absorbed into adjoining districts. A new district was created, in the Western Division, with headquarters at Wentworth where there is urgent need for instruction in irrigation methods, pastures establishment and vegetable production.

The demand for district agronomists' services has increased such that subdivision of districts is needed for a sufficient service.

Agronomists have been relieved of judging local crop competitions, to provide for more attention to conduct of field days, supervision of experiment and demonstration plots, and crop pasture seed production schemes.

Agricultural Extension Grant Affects.—As a result of funds being made available by the Commonwealth Government for specific projects to be undertaken in the field of agricultural extension, the work of this Division has expanded considerably. About 50 per cent. of the £96,000 available to the Department from this Grant in 1955-56 has been expended by the Division of Plant Industry, excluding from that total an amount of £16,000 for trainees and cadets. Demonstrations at present total 420.

With Grant funds it has been possible to employ seventeen field assistants who are located in various parts of the State and directly responsible to a district agronomist or Regional Supervisor. Each field assistant is provided with a utility truck.

The Italian liaison officer stationed in the Murrumbidgee Irrigation Areas, with headquarters at Griffith (see under "M.I.A. Agricultural Services") is another officer of this Division employed under the Grant.

Dairy Industry Extension Grant Affects.—Portion of the Dairy Grant funds is expended on pasture demonstrations, involving district agronomists. Some 250 demonstrations were in hand during the year, including pasture trials, silage making and cut worm control in pastures. Of the total, 104 demonstrations commenced during 1955-56.

Floods.—Rainfall in the past nine years has been well above average over the greater part of New South Wales. Early this year there was a repetition of severe and extensive flooding of many coastal and inland streams.

Farmlands in the Hawkesbury River basin were seriously damaged. Major floods occurred along the Tweed, Richmond, Clarence, Manning and Hawkesbury rivers. The position was less serious along the Macleay, Hastings, Hunter and Bega rivers. Inland there were major floodings on the Gwydir, Macintyre, Barwon, Namoi, Macquarie, Darling, Murrumbidgee and Murray Rivers.

At present much of the State is suffering from an excess of moisture and large tracts of country are water-logged. Crop production is affected and many stock problems have been created.

Rains are still continuing in the basins of the Murrumbidgee, Murray and Darling rivers and tributaries and as the waters approach the lower reaches of the Murray and Darling rivers record floods are predicted.

District agronomists were called upon to investigate many applications for flood relief. Some areas have been flooded on a number of occasions within the past year and rehabilitation of farmers there presents a serious problem.

Grasshoppers.—Grasshoppers occurred in plague proportion in the south-west. Reference to the control campaign occurs in this report under "Pastures Protection Boards", "Entomological Branch" and elsewhere. The principal agronomist (extension) is a member of the Grasshopper Control Campaign Committee.

Superphosphate.—Resulting from the rapid expansion of pasture improvement, in which superphosphate is a principal fertiliser, supplies were previously insufficient; supply now exceeds demand. This unexpected change has been attributed to (a) the extremely wet season, (b) increase in production of superphosphate by manufacturers in New South Wales, (c) restriction of rural credits, (d) accumulated stocks on farms.

The delivered total of superphosphate approximated that of last year but manufacturers have installed additional plant capable of increasing production by approximately 30 per cent. However, the wet season induced a prolific growth of pastures.

far beyond normal stock requirements, and farmers have been loath to increase the growth by application of fertiliser. In many instances the continued wet weather has delayed the application of superphosphate to both pastures and crops.

Wheat.

Until October, 1955, crops made phenomenal growth and promised outstanding yields. Continuous rains then set in, leading to widespread lodging and, in central and some southern districts, a stem rust epidemic.

Acresage.—Approximately 3,000,000 acres were sown for all purposes, and some 2,730,000 acres were stripped for grain. Approximately 57,000,000 bushels of grain were harvested, a total yield close to the average annual (56.1 millions) for the ten-year period 1945-1946 to 1955-56. Estimated average yield of approximately 20.9 bushels per acre almost equalled the record average yield of 21 bushels per acre obtained in 1952-53.

F.A.Q.—The F.A.Q. was declared at 62 lb. per bushel bulk, and 61 lb. per bushel bagged, compared with 61½ lb. per bushel in the previous year. The grain sample was bright and attractive despite the wet season. Northern Zone samples were excluded from F.A.Q., and wheat was received into three different pools according to the nature of the sample. The average protein content, 9.4 per cent., is the second from lowest on record and is attributed mainly to the wet season and unfavourable harvesting period.

Varieties, Acresage Trends.—Statistics for 1945-55, the latest available, indicate the following as the more popular varieties:—Bencubbin, 37.45 per cent. of the acresage; Gabo, 18.08 per cent.; Kende, 16.23 per cent.; Glenwari, 4.78 per cent. Ford has dropped to fifth place and Charter to eighth place. Main change is the marked increase in the popularity of Glenwari (from seventh place in 1953-54). Festival acresage has increased from 3 per cent. in 1952-53 to 3.19 per cent. in 1954-55.

A number of new varieties was widely tested in farmers' experiments:—

Farmers' Varietal Tests.—In the Northern Division, Gabo was the most outstanding, and Spica performed well, as did Festival, Koda, Sherpa and Charter. In some localities, Sabre and Broughton showed promise. Panther, Dowerin and Ford gave disappointing yields.

In the Central Division, the outstanding varieties were Glenwari and Kende. Gabo and Dowerin fared well, but Saga and Brolga gave disappointing results, as did Bencubbin and other rust susceptible varieties, in areas which were most affected by rust. During the year, Javelin 48 was included in Departmental recommendations for 1956 sowings in most of this division and there has been a marked increase in sowings of this variety.

In the Southern Division, top yielders were Glenwari, Bordan, Kende and Gabo. Where sown, R.D.R. x Ridley gave outstanding yields. During the year, Javelin 48 and Curlew, both of which possess grain quality superior to Bencubbin, were included in Departmental recommendations for 1956 sowing for most of this division.

In 1/40th acre trials carried out by the Wagga Agricultural Research Institute, outstanding late maturing hybrids were K.F.B. x P, x B and M. SHJ. x D x N. Outstanding mid-season maturing hybrids were Scimitar x Kenya x Bobin (R.A.C. 170) and R.D.R. x 4 Ridley. Outstanding early to mid-season maturing hybrids were C x P, x B W4412. Outstanding early maturing hybrids were R.D.R. x 4 Insignia and Gabo x 3 Dirk.

Wheat Diseases, Varietal Reactions.—A severe stem rust epidemic, after the spring rains, seriously affected yield and grain samples in most of the central west and in some parts of the southern division.

At all centres, the Departmentally bred Festival was observed highly resistant to stem rust. Excellent resistance was exhibited this season by Celebration, Glenwari, Sabre, Bordan and Kende; and by Gabo and Javelin 48 in the south. Varieties badly affected by stem rust included Bencubbin, Curlew, Brolga, Pinnacle, Insignia, Kondut, Koala, Ford and Javelin. Newer varieties, back-crossed for rust resistance, weathered the epidemic particularly well.

Septoria tritici and *Septoria nodorum* probably caused more overall damage to wheat crops than did stem rust, especially so far as grain samples were concerned. The disease took the form of leaf blotch, stem browning and glume rot. In many cases it caused premature ripening followed by severe grain pinching. Javelin, Brolga, Insignia and Warigo showed marked susceptibility to this disease.

Flag smut was very light. The new variety Koda, released by the University of Sydney, has somewhat similar field characteristics to its parent variety Gabo but in addition has resistance to flag smut. An increasing area sown to this variety should reduce the chance of flag smut in the main "Gabo belt".

Research into problems associated with root rots and arising from soil fertility levels in the south of the State was continued by the Wagga Agricultural Research Institute, and receives reference in that Institute's section of this report.

World Rust Nursery and Wheat Variety Collection.—These have been maintained at New England Experiment Farm, Glen Innes. Further introductions are on the way from the United States of America.

Wheat Improvement.—The north-west wheat breeding programme, in association with that of the University of Sydney, continued. Emphasis was on rust resistance, winter wheats, and durums.

Winter Wheats.—One winter hybrid again yielded well above Winter Minflor. This hybrid possesses resistance to flag smut as well as a complementary dual resistance to stem rust, and has promising grain quality. Field trials on its grazing potential have been promising but are not complete. Should this line ultimately prove of commercial value, there is adequate available material approaching fixity on which to base future wheat breeding programmes.

Durums.—Action is in hand to name as Dural the new durum wheat variety Aleppo x Palestine. It was bred by the Department, in co-operation with the North-west Plant Breeding Association and farmers throughout the north-west. Last year, six co-operating farmers in the north-west planted "seed increase" areas of this durum. Using seed from these areas, approximately 200 acres will be sown in 1956-57.

Wheat Experiments.—Yield and quality testing of varieties continued at Experiment Farms and Stations.

Wheat experiment plots conducted with co-operating farmers, for yield and demonstration purposes, comprised 60 experiments, with 56 farmers, in 19 agronomists' districts, testing 29 wheat varieties.

Wheat fertiliser trials following a pasture ley period were sown on farmers' properties but comprehensive results will not be available for a few years.

Indications of a need for superphosphate on some north-western wheat lands which previously did not require this fertiliser have been noted.

Trials and demonstrations concerned with the cropping of land following a pasture phase continued at Experiment Farms.

To date they have demonstrated that wheat sown after a pasture containing a legume gives better yields and higher protein content of grain than wheat sown on land which has been allowed to regenerate naturally.

A comprehensive rotation experiment was initiated during the year at Condobolin Experiment Farm, from which soil samples have already been forwarded for analysis.

Further Agricultural Extension Grant demonstrations of pasture sown with wheat were successfully established in 1955, and some demonstrations in which establishment was unsatisfactory in 1954 were re-sown. Sixty-nine such demonstrations have now been initiated, distributed over 28 wheat centres.

Field Competitions.—Main features of interest were: the outstanding yields of wheat crops grown after a period of clover ley; the excellent performance of rust-resistant wheats; and many varieties of good baking quality.

Flood rains prevented judging in the Northern Division; but five additional championships were conducted by the Royal Agricultural Society, along similar lines to previous years, for which field judging was arranged by this Department. In addition, the R.A.S. sponsored a special field wheat competition in the Southern Slopes Division, which eliminated Championship judging in the field.

For the 1956 competitions, the R.A.S. is arranging local judges. Championships in all six Divisions will be judged by Departmental officers.

Twenty-four Junior Farmers from 13 clubs took part in a wheat-growing project and 11 Junior Farmers from 9 clubs took part in the oat-growing project. Top wheat yield was 50 bushels and top oat yield was 63 bushels per acre.

Foundation Seed Supplies.—Foundation Seed of wheat, oats and barley was produced in quantities more than sufficient to meet demands for experiments and by Registered Seed growers. The surplus will be carried over.

"Initial selection" work and "preliminary increase" of wheat and oats continued at Temora Experiment Farm. In addition, "initial selection", "preliminary increase" and "foundation sowings" of some oat varieties suitable for northern tableland conditions were undertaken at New England Experiment Farm.

Foundation Seed was produced last season at Wagga Agricultural College and Experiment Station, Temora, Condobolin, Trangie, Leeton and Tamworth Experiment Farms.

Condobolin Experiment Farm, on the western fringe of the wheat belt, produced the phenomenal average yields of almost 33 bushels per acre from 250 acres of wheat harvested for grain, and 39 bushels per acre from 280 acres of oats harvested for grain.

Registered Seed.—In 1955, Foundation Seed was supplied to 92 Registered Seed wheat growers, who undertook seed increase of 17 wheat varieties, and to 81 Registered Seed oat growers, who seed-increased 11 oat varieties. Arrangements have been made to supply Foundation Seed from the 1955-56 harvest sowings, to 99 Registered Seed wheat growers, 81 Registered Seed oat growers and 6 Registered Seed barley growers.

In the south of the State, impetus was given to the organisation of Registered Seed production by the setting up of a Cereal Seed Producers' Association.

Wheat Grading.—Desirable changes in the F.A.Q. system of wheat marketing have been considered by a Committee, and recommendations have been submitted to the Minister. There is further reference in this report under "Chemist Branch".

Oats.

The estimated area sown to oats for all purposes in 1955-56 was 1,400,000 acres; well above the previous record. Grain yield was estimated at 18,000,000 bushels from 1,000,000 acres, averaging 18 bushels per acre, whilst hay production was estimated at 140,000 tons, averaging 1.2 tons per acre.

Due to the wet season, crops were not grazed as heavily as usual and severe lodging occurred before harvest. Stem and leaf rust caused substantial damage, particularly to the later-maturing crops, and the general grain sample was below standard.

Oat Variety Tests.—Oat variety testing at Experiment Farms and on farmers' properties continued, but some trials had to be abandoned due to excessively wet conditions.

The newer varieties Dale, Ballidu and Orient are being more widely grown by farmers. They compare more than favourably with Belar and Fulghum in yields of fodder and grain. In the latest oat variety census for the State they were fifth, sixth and seventh respectively in acreage.

The Temora Experiment Farm hybrid, F.F.G. Markton, maintained its promise, for grazing and grain, and during the year application was made for its naming as Fulmark.

Other varieties showing promise in advanced trials at Experiment Farms in the slopes areas, were Avon (a new variety from Western Australia), Yates Algerian, and Osage (a variety introduced from U.S.A.); whilst, in tableland areas, Garry, a rust-resistant variety from Canada, performed well in spring sowings for grain.

At New England Experiment Farm, several hybrids were further tested. The more outstanding were V.R.A.F. W4514 and V.R.F.B. W4304. These two hybrids are late maturing and are considered better than Algerian for grazing, grain production, and straw strength.

Seed Production.—See under "Wheat".

Barley.

The estimated area sown for all purposes in 1955-56 was 75,000 acres, compared with 51,000 in 1954-55 and 41,000 in 1953-54.

Barley breeding and experimentation are in abeyance.

Seed Production.—Pure seed production continued at Wagga Agricultural College and Experiment Station in 1955-56. Included in the Foundation Seed production areas, was the recently released Departmental variety, Ablvn.

Ablvn, a cross between Abyssinian and Flynn, was selected at Wagga Agricultural College and Experiment Station as a 6-row feed type barley for green feed and grain, to replace Trabut. It has yield and straw strength superior to Trabut, and an added advantage in that the awn is almost completely smooth.

Foundation Seed of Ablvn was supplied to four Registered Seed Growers for 1956 sowing.

Comparative Fodder Trials.—Comparative fodder trials of barley, oats, and wheat were continued at New England Experiment Farm. They indicate that oats is the best cereal grazing crop on the tablelands, whilst winter wheats recover after grazing to produce the best grain yield.

Rye.

Acreage.—Normally only small areas are sown, but interest in this crop is increasing due to the influx of new Australians. Increased acreages are likely following the assurance by one firm alone that its requirements for the present season—if available from New South Wales—would be 150,000 bushels. This would be only 44,000 bushels less than the highest recorded annual production in New South Wales, 194,000 bushels in 1939-40.

Seed Production.—Arrangements have been made to sow isolation areas at New England Experiment Farm of Strain 8, Balbo, Montanum Winter and Mitchell's Winter. Pure seed areas of Weethalle, the best yielding strain for grain, have been sown at Trangie Agricultural Experiment Station.

Maize.

Floods occurred in all maize-growing districts. Cutworms and armyworms also damaged crops on the northern tablelands.

Early in 1956 a high average per acre yield was anticipated, but by June an overall mediocre yield was expected because of the very wet autumn. Leaf blight, stalk rots and cob rots were much in evidence and weevils also caused more damage than usual.

Likely production has been estimated at 1,650,000 bushels from 55,000 acres to be harvested for grain; 30 bushels per acre; compared with 1,767,000 bushels from 51,000 acres in the previous year; 34.6 bushels per acre.

About 70 per cent. of the acreage was sown with hybrids this year.

Hybrid Maize Improvement Programmes.—Programmes were continued at Grafton and New England Experiment Farm. The wet season caused difficulty during the hand-pollination periods. Some breeding areas were lost at Grafton through flooding, but most matured to give reasonable results.

The white hybrid maize programme has been temporarily reduced because of other work. The yellow programme is more important. There is no pressing demand for white types. The white hybrid tested last year performed well but no better than the yellow types.

Considerable expansion has occurred in the leaf blight resistance and male sterility investigations at Grafton Experiment Farm.

Good progress is being made in evaluating the large number of inbred lines introduced from U.S.A. in recent years.

District Trials.—Twenty-eight trials for grain production and six for fodder were sown. Because of wet conditions, several intended trials could not be sown, and many which were sown were destroyed by floods.

Hybrid Maize Foundation Seed Production.—Satisfactory yields of Foundation Seed have been obtained. All demands for seed for 1956 sowings will be met and a reasonable carry-over will remain.

Hybrid Maize Certified Seed Production.—Nine thousand bushels of Certified Seed are expected, compared with 9,246 bushels last year. Because of the excessive rain, the season has been extremely difficult for seed producers. About 40 of 288 acres sown for Certified Seed were lost.

A very promising mid-season hybrid, GM 211, was released for seed production for the first time this year.

Maize Experiments.—Fertiliser, and spacing, and seed treatment trials; flat versus round seed; residual effect of insecticides; and the red clover-maize rotation; were under observation at several locations on private farms as well as on the Experiment Farms.

Quarantine Area—Maize Introductions.—Leeton Experiment Farm has been proclaimed the maize quarantine area for New South Wales. The first introductions were grown there very successfully during the past season.

Sweet Corn.

The breeding programme was maintained at Yanco Experiment Farm.

Good supplies of Foundation Seed are available to sow the coming season's commercial seed production areas.

Lochief, the hybrid from Iowa, U.S.A., continues to give good results although Golden Cross Bantam is still by far the most popular sweet corn in New South Wales on acreage. Ioana is grown to a limited extent for canning.

Popcorn.

The popcorn breeding programme has been discontinued at Leeton and is now carried on at New England Experiment Farm.

Five popcorn hybrids were released during the year for limited Certified Seed production on the northern tablelands. All are based on U.S.A. inbred lines.

Sweet Sorghum.

Improvement.—Improvement (and Foundation Seed production) with the varieties Sacaline and White African, has been carried on at both Hawkesbury Agricultural College and Grafton Experiment Farm. Improvement of Early Orange has been continued with the co-operation of Mr. G. Paten, of Moruya.

Certified Seed Scheme.—Since the introduction of the Sweet Sorghum Certified Seed Scheme last year, there has been no further complaint regarding poor quality sweet sorghum seed.

Last year twenty-four seed growers produced 3,435 bushels of Certified sweet sorghum Seed from 125 acres, an average of 27.5 bushels per acre. Some 5,000 bushels are expected this year from 168 acres, about 29 bushels per acre.

District Trials.—Because of shortage of seed caused by floods and bird damage in the 1954/55 season, only four district trials were sown this year.

Grain Sorghum.

Despite good rainfall, lower grain sorghum yields are expected. Sorghum midge and aphid have been responsible; 33 per cent. production loss has been estimated in the north-west.

Foundation Seed.—Production of seed of established and newer varieties was continued at Yanco and Leeton Experiment Farms. Trial areas for Foundation Seed production of the variety Caprock were sown also in the north-west.

Cultural Experiments.—These were continued mainly at Yanco Experiment Farm.

District Trials.—Ten were sown. The variety Alpha, introduced from Queensland, continued to show promise and has been added to the list of recommended varieties in New South Wales.

Broom Millet.

Early, the season favoured millet, but from February the excessive rainfall in all broom millet districts severely damaged crops prior to and during harvesting. Many crops were destroyed by flooding. The fibre quality was low in general.

Production was estimated at 12,000 cwt. of fibre from about 1,850 acres; compared with 7,700 cwt. from 1,300 acres in 1954/55.

Improvement Programmes.—The improvement programmes continued at Bathurst Experiment Farm and in the Tumut district. Bathurst's improved strain, referred to last year, gave disappointing results at Tumut and the trials there will cease. It will be tested in other districts in the coming season.

The fertiliser trial at Tumut continued. The results are not yet available.

Fodder Millet.

Fodder millet acreage was reduced because of the abundance of pasture growth in spring.

Seed Production.—Starr pearl millet seed production was set back by poor germination of seed, produced at Hawkesbury Agricultural College last year and subsequently damaged by mould.

Sudan Grass and Columbus Grass.

A greatly increased area was sown to S.S.6 sweet Sudan grass. This strain again gave excellent results in trials and on commercial areas. A much larger quantity of seed will be available to farmers for this sowing.

Columbus grass (*Sorghum alnum*) improvement was pursued at Grafton Experiment Farm and Trangie Agricultural Experiment Station. This grass has been proclaimed a noxious weed in New South Wales under the Seeds Act, but has so many good features as to justify the expectation of success for the improvement programmes.

Fodder Cane.

The trial at Grafton Experiment Farm was continued, and four new trials were commenced in the Kempsey area with disease-free planting material introduced from the Tweed river district. In Kempsey district all areas of fodder cane were previously showing severe infection with Fiji disease. An attempt is being made by the district agronomist from Taree to clean up the area.

Summer Legumes.

Trials, and limited seed production were continued at Grafton Experiment Farm with soybeans; cowpeas; sunn hemp and other species of *Crotalaria*; velvet beans; mung beans; lab-labs; and kudzu. District trials continued on the central and north coast.

Soybean trials, and limited seed production continued at New England Experiment Farm.

Winter Legumes.

Trials and seed production of Lima, Kellerva and other introduced varieties of field peas continued at Grafton Experiment Farm, and recommenced at New England Experiment Farm. Vetches were also under test at Grafton Experiment Farm.

Rape and Kale.

Interest in seed production of these crops has developed.

Rice.

General.—Final estimates of yield were 2.16 tons per acre for the Murrumbidgee Irrigation Areas, compared with a little over 2.5 tons in 1954-55 and 2.35 tons per acre in 1953. Abnormally wet conditions delayed harvesting and many crops remained to be stripped at the end of June. Indications are that the entire crop will be harvested despite extreme difficulties in some cases.

Pure Seed Rice Scheme.—There is no doubt that the Department's Pure Seed Rice Scheme has contributed substantially to rice yields.

The 1956 harvest of Foundation Seed was completed satisfactorily before the onset of wet weather, and sufficient seed was harvested to permit the planned increase of 33 per cent. in pure seed production at Leeton Experiment Farm next season.

Variety Improvement in the Wakool District.—The programme of testing and selecting early strains suited to the Wakool district was continued. Further selections were made, and fifteen bags of promising seed, Calusa 180, were harvested from a half-acre pure seed block. This variety showed to advantage in all trials, with a highly satisfactory yield, strong straw, and even maturity. Its earliness permits water savings, and harvesting under warm and generally drier conditions.

The America variety Calrose was tested in the district for the first time. It appeared promising, for earliness, good quality and yield potential.

Investigations—Artificial Drying of Rice.—The rice industry co-operated in an extensive investigation of the advantages of artificially drying rice, after harvesting at moisture contents above the customary 16 per cent.

It was determined that the maximum yield of unbroken kernels, after milling, was secured with rice harvested at moisture contents between 20 per cent. and 25 per cent. Broken kernels are less valuable than whole rice and their prevalence is increased when the rice crop shows much evidence of the conditions known as "sun-cracking".

Sun-cracking, the development of surface cracks on the rice kernel, is apparently brought about by internal stresses in the grain and commonly develops during the period when moisture content is declining from 20 per cent. down to 16 per cent. in the standing crop. Controlled artificial drying tends to reduce sun-cracking, besides permitting earlier harvest in advance of possible rainy conditions.

Assistance to Northern Territory Rice Ltd.—The Chief, Division of Plant Industry, continued to act in an advisory capacity to Northern Territory Rice Ltd. in the project to establish the rice industry in northern Australia.

Overseas Experience for Rice Breeder.—Rice Breeder, Mr. T. R. Lawler, returned after a twelve months' stay in Italy as holder of a Rice Scholarship provided by the Italian Government. He gained valuable experience, particularly in rice diseases and laboratory valuation of rice quality.

During the year Mr. Lawler was also Australian nominee in the F.A.O. Working Party, Rice, which met at Penang, Malaya, in December, 1955.

Tobacco.

Breeding for Blue Mould Resistance.—Blue mould, in seedbed and field, is the most important disease affecting tobacco in Australia. Under conditions of severe field mould, a number of selections from Bathurst Experiment Farm crossbreds showed a significant degree of field resistance.

Inter-specific crosses, between commercial tobacco varieties and blue mould resistant "wild" *Nicotiana* species, of Australian origin, were advanced to a third backcross generation. The aim is to combine blue mould resistance and useful smoking quality.

Irradiation Experiments.—In conjunction with Professor Messel of the University of Sydney, irradiation of tobacco seed was undertaken to critically high levels; and some 30,000 resultant seedlings were exposed to severe dosages of blue mould spores. Three of the plants appeared to have derived by the treatment some resistance to the disease. Their seed was saved for further trials next season.

Funds for Tobacco Research.—An amount of £14,200 was made available in June from joint contributions to a Trust Fund by tobacco growers and manufacturers, and State and Federal Governments, for increased tobacco research in New South Wales.

Hops.

Yield and Quality Trials.—The trial plot of the Golden Cluster strain at Bathurst Experiment Farm again yielded at the rate of over 2,000 lb. of cured hops per acre. One thousand gallons of beer were brewed successfully by a commercial brewery using hops produced from this plot.

This State imports £750,000 worth of hops each year. Departmental trials have shown that the crop can be successfully produced in a number of districts of New South Wales. The high outlays necessary to establish a hop garden and associated kilns are militating against potential grower-interest.

Linseed.

Grower dissatisfaction with prices, yields, and disease and pest problems explain the continued small acreage.

The Departmentally introduced variety Plate proved superior in yielding ability to the previously exclusive variety Walsh last year, with the result that at least half the linseed sown this autumn is Plate.

Improvement and Trial Programmes.—At Tamworth Agricultural Experiment Station and on the properties of co-operating farmers it was shown that there are varieties of still greater probable value than is Plate. Marine, bred in the U.S.A., proved outstanding in trials, being a good yielder and resistant to Pasmio disease. At least 200 acres are expected to be sown to Marine in 1956-57.

With grower uncertainty concerning wheat markets there is increasing interest in both linseed and safflower as alternative crops. A series of trials at centres in the north-west this year disclosed that the returns secured from these alternative crops compare favourably with those from wheat.

Safflower.

Trends.—Safflower is increasing in popularity in the north-west with sustained demand for the oil, which is non-yellowing with age and used in light coloured pastel paints. The crop

has not so far proved to have any serious disease or insect enemies. In 1955-56 some 400 acres were harvested in New South Wales but it is anticipated that 2,000 acres will be sown for 1956-57 harvest.

Trials.—From co-operative trials with the C.S.I.R.O., the variety S23(1) bred by that organisation has been selected and is expected shortly to be named.

Seed Production.—Four acres of S23(1) have been sown in the north-west, as well as 2 acres at Leeton Experiment Farm, to provide seed for distribution to commercial growers in 1957-58 season.

Peanuts.

Introduction, Selection and Seed Increase.—These activities continued at Grafton Experiment Farm, in respect of new varieties, but prolonged wet weather seriously affected the peanut harvest at that Farm.

Trial Areas.—Trial areas were again sown for western districts such as Bourke, Barham and Deniliquin, but, as occurred in 1954-55, although good crops were set a high proportion of the nuts could not be harvested due to wet weather.

In the principal peanut area, on the far north coast, the downward trend of the previous two seasons continued; only a token acreage was sown, reflecting the farmers' views of the low prices.

Ramie.

Fibre Extraction Results.—Experiments continued at Wollongbar Experiment Farm, using a fibre extraction process patented by a Sydney business man, Mr. M. Wise. Most encouraging reports have been received from a large English spinning and weaving firm on the value of this fibre but leading local firms appear apathetic. A further large sample has been sent overseas. Ramie fibre is extremely versatile, capable of producing anything from bagging to fibre linen, but cost of production has been its main drawback. The Wise process is relatively cheap.

Miscellaneous Oil and Fibre Crops.

Work with sunflower, lavender, pyrethrum, tea and other miscellaneous crops was continued on a restricted scale. Strains and pure seed lines were maintained.

A series of leaflets was prepared to meet the limited but sustained inquiries concerning the cultivation and commercial possibilities of these crops.

Tea Trials.—Were established on two north coast farms.

Vegetable Section—General.

Tomato and bean improvement are on a better footing at Hawkesbury following the appointment of an additional officer to undertake disease resistance tests and to assist the vegetable programme in general. Appointment of an officer to Bathurst Experiment Farm for vegetable investigational and introduction work, has facilitated an expanded programme at that centre.

Transfer of the potato variety testing and seed production project from Crookwell to Orange facilitated their organisation and supervision by Bathurst Experiment Farm.

Provision of a glasshouse for potato breeding at the New England Experiment Farm, Glen Innes makes possible more emphasis on breeding for disease resistance. The potato work at Glen Innes and Orange have been closely co-ordinated with benefit to both.

Yanco Experiment Farm's vegetable improvement programme is now giving special attention to development of better varieties of green peas and tomatoes for processing. Pea production problems are also being investigated.

Transfer of the Murwillumbah district agronomist to a specialist position in head office, in April, left the Terranora Demonstration Plot without supervision but satisfactory arrangements were made for continuation of the vegetable programme pending an appointment.

The bean seed certification officer resigned and the delay prior to appointment of his successor, with headquarters at Bega, disorganised seed certification work on the south coast.

The report of the principal agronomist (vegetables) on his investigations in the United States of America, Canada and the United Kingdom, was widely distributed to Commonwealth and State Departments, vegetable industry organisations, and selected individuals, and was well received.

Recurring floods, and the rapid spread of Sydney's population and industry, forced more market gardeners in the County of Cumberland either to abandon vegetable production or move to more distant areas. The trend may foreshadow an expansion of processing and marketing inland.

Potatoes.

Breeding.—The glasshouse at New England Experiment Farm has consolidated the breeding programme, permitting crossing and testing for disease resistance under "controlled climate" conditions.

Forty-five crosses and numerous selfings were made, using parents with resistance to one or more of the major potato diseases. Pollen parents included Cherokee and Menominee from United States of America, and the local varieties 11-79, Adina and Awaba. The female parents included 1928(e)2, 1021(e)3, and 854, from Scotland, and Sequoia, Saranac, Russet, Burbank and Pungo, from United States of America.

Of the 8,000 seedlings sown, 4,000 are being screened for resistance to late blight. The remainder were transplanted from nats to pots, and grown to maturity in the glasshouse. Previously first year seedlings had to be grown in the open. Promising selections were made from the crosses 66-10 x 11-79, 128 x 11-79, 1928(e)2 x Katahdin and B24-58 x 202/104.

Second year seedlings, totalling 350, were grown at the Mann River Sub-station, and eighty of these were selected for further testing. Promising selections came from the crosses Monak x 11-79, Awaba x 336-123, S2540 x Adina and S2680 x Adina.

One hundred and twenty third year seedlings were grown in plots of 10 to 20 hills, and 32 lines were retained. Two selections from each of the crosses Awaba x 336-123 and 66-10 x 11-79 appear excellent types. A red-skin selection from S2680 x Adina and a smooth, white-skin type from S2540 x Adina also did very well.

Twenty-three fourth year seedlings were grown, and eleven were selected for further testing. The most promising were two selections from Monak x 11-79 and one from Sequoia x 11-79.

Forty-seven of the most advanced seedlings were included in a preliminary yield trial on a farmer's property. S2854 was outstanding, with a heavy yield of high quality tubers. Other lines which performed well came from the crosses 835-4 x Awaba, Monak x 11-79 and Sebago x 11-79.

Transfer of Advanced Testing and Seed Increase.—While breeding and preliminary testing are conducted at New England Experiment Farm on the northern tablelands, advanced testing and seed increase have in the past been carried out on the southern tablelands. This season the latter activities were transferred from the southern to the central tablelands. This permitted much more detailed supervision by the officers of Bathurst Experiment Farm.

Potato Introductions.—Twenty-four new introductions were grown in quarantine, and of these the most promising were 1928(e)2 and 2079(a b)7, from Scotland, and Saco, Merri-mack and B75-4, from U.S.A. Of the older introductions, Pungo, Delus (B73-18) and Plymouth (B73-10), all from U.S.A., performed well.

Disease Resistance.—Because of the glasshouse, lines susceptible to late blight, and virus, can be screened in the seedling stage; and 2,000 seedlings were so handled this year.

The ferric chloride test was used as required to determine the resistance of seedlings to common scab. Tests were undertaken to determine whether young seedlings can be screened for scab resistance by growing them in vermiculite infected with the common scab organism.

Soil Fertility Investigations.—The excellent results from the soil fertility demonstration at Guyra were repeated. This demonstration, being conducted in co-operation with the Guyra Potato Growers' Association, has definitely shown local growers (i) that effective improved pastures can be established on their "worn-out" red soils, and (ii) that a period under a clover-rich pasture vastly increases the yields subsequently from potatoes and oats.

Variety Trials.—Twenty-six trials of new varieties and seedlings were established in the main potato growing districts, but floods or continuous rain prevented yield comparisons in many districts.

In early trials planted from July to September, 1955, S2705, S2671, and S2704, all Departmental seedlings, performed well. Crops also bred by the Department. Early Ashworth introduced from the United States Department of Agriculture, and

Exton, a Victorian variety, gave satisfactory results in most cases. Walanga yielded well, though it is rather late in maturing.

In maincrop districts, planted in late October to mid-December, Walanga, released by the Department last year, again performed very well in yield and disease resistance. Ontario, Kennebec and Empire, all from U.S.A., showed promise in early-maturing trials. A Glen Innes seedling, S2671, which closely resembles Walanga, performed well in the late maturing section.

Potato Seed Certification.—The potato seed certification officer field inspected the seed areas on the central and southern tablelands. A total of 1,076 acres was submitted for certification, by 126 growers; compared with 1,571 acres, by 171 growers, last season. An aggregate of 882 acres, for 105 growers, was provisionally certified; compared with 1,256 acres, for 113 growers, last year. The decline in certified seed production reflects the decrease in overall production of potatoes in New South Wales.

Potato Cooking Tests.—Cooking tests on promising varieties, developed by the Department or introduced from overseas, were undertaken by the C.S.I.R.O. In future, no new seedling will be named if not of good cooking quality. This season, Sebago, Walanga and two seedlings, S2671 and S2776, revealed satisfactory cooking qualities in the C.S.I.R.O. tests.

Chemical Treatment of Cut Setts.—Experiments to prevent pre-emergence decay are continuing, but this season's results have been delayed by continued wet weather which has impeded harvesting.

Maleic hydrazide, which has a hormone-like effect in delaying growth, was sprayed on the potato haulms four weeks before maturity at the rate of 400 and 800 p.p.m. respectively. The tubers from untreated plants after fifteen weeks storage showed long white shoots. The 400 p.p.m. treatment showed only occasional tubers with weak shoots, while the 800 p.p.m. treatment retarded sprouting to a marked degree. The experiments are being continued.

Agricultural Extension Grant Demonstrations.—Three demonstrations of potato production in new districts were established. The potato moth control demonstrations in previous years were so successful that only four were considered necessary this season. However, due to the wet weather potato moth did not make its appearance and the controls were not applied.

The glasshouse at New England Experiment Farm supplied through Extension Grant funds has proved a valuable medium for demonstrating the means of detecting the obscure symptoms of virus disease, of plant selection, and of varietal characteristics and disease resistance. Approximately 500 visitors shown over the glasshouse have had the various aspects of the work described to them.

Tomatoes.

Tomato Breeding.—The breeding of market and canning varieties for fusarium wilt resistance continued at Hawkesbury Agricultural College and Yanco Experiment Farm.

Of twenty-one lines of the cross Rouge de Marmande x Pimpinellifolium A160, tested at Hawkesbury Agricultural College for resistance to *Fusarium oxysporum f. lycopersici*, eleven were immune. Several selections of the best lines were made for agronomic qualities. Two fixed lines of Grosse Lisse x Tatura Dwarf Globe again showed promise for canning, in tests at Bathurst Experiment Farm. Several F₁ hybrids were yield tested, and Valiant x Grosse Lisse, Potentate x Grosse Lisse, and Break o'Day x Rouge de Marmande, were considered the best combinations.

At Yanco Experiment Farm several selections of Pan America crossbreds in F₂ generation were made, to determine suitability for canning. Sixteen crosses, involving Tatura Dwarf Globe, Bounty line, TX 160A-1-1, Kokomo and M3 from C.S.I.R.O., were successfully effected.

Introductions.—The most promising introductions tested were:—Red Top and Manalucie from the United States Department of Agriculture, Kokomo, Red Jacket, Bonita, Ottawa To-4, Ottawa To-10 and Ottawa To-17 from the Canadian Department of Agriculture, Jefferson and Chesapeake from Associated Seed Growers Inc., New Haven, U.S.A., and Daydream from Rumseys Seeds Pty. Ltd., Parramatta.

Beans.

Bean Breeding.—Breeding for disease resistant varieties of good agronomic type, for market and processing, continued at Hawkesbury Agricultural College and Yanco Experiment Farm.

At Hawkesbury Agricultural College, 46 varieties, 140 cross-bred lines, and 30 Hawkesbury Wonder single plant selections, were tested for resistance to the two races of anthracnose known to exist in New South Wales.

Brown Beauty (ex Biological Branch), Tweed Wonder, Wellington Wonder, King Green, and Tender and True, were resistant to race No. 1.

Fullgreen, Landreth Stringless and Emerson 15 were highly resistant to race No. 1 and moderately resistant to race No. 2.

Six lines of the cross Fullgreen x Brown Beauty in the eighth generation were resistant to race No. 1, and one line was resistant to both races. All lines possess good field tolerance to American common blight, moderate resistance to rust and desirable agronomic qualities.

Two lines of Brown Beauty x Little Navy in the seventh generation were resistant to both races of anthracnose and several lines to race No. 1, while several lines of Clarendon Wonder x Little Navy in the eighth generation were resistant to race No. 1. The Little Navy crossbreds are white seeded, semi-dwarf, dry shell beans, which were developed for mechanical harvesting.

One line of Brown Beauty x Doppelite in the 6th generation proved resistant to both races of anthracnose and two lines to race No. 1.

Several selections of the cross (Brown Beauty x Red Mexican) x (Hawkesbury Wonder x Little Navy) in the 5th generation were resistant to race No. 1, and one line to both races of anthracnose. Selections of Brown Beauty x Red Mexican in the 5th generation were resistant to both races of the disease.

The most promising of the disease-resistant crossbreds of advanced generation have reached the stage of field testing for commercial suitability. These tests were projected for this year, but floods destroyed the crops.

Several promising stringless lines were selected from the crosses Brown Beauty x Landreth Stringless in the 4th generation, and from Fullgreen x Brown Beauty and Westralia x Hawkesbury Wonder, both in the 5th generation.

The cross Hawkesbury Wonder x Granda in advanced generation, although not resistant to disease, was very promising because of its heavy early cropping and good quality.

Breeding work at Yanco Experiment Farm aimed also to develop bush stringless varieties with the pod qualities of Blue Lake. Crosses were made with Seminole, Contender and Processor, with Blue Lake RM 1. as the main parent.

Bean Introductions.—Of the many introductions tested, the most promising were: Contender, King Green, Processor, Streamline, Columbia (pole), Slendergreen, and Seminole, all from U.S.A. Seed of these varieties were produced for further observation under commercial conditions.

Cluseed King of Beans, a broad bean from J. L. Clucas, England, gave promise at Yanco. The erect, vigorous plants produced an abundant crop of straight pods about 8 inches long.

The field beans, Corvette and Genesec, from Canada, gave encouraging results at the New England Experiment Farm. Corvette was the better cropper, comparing favourably with Small White. It was also promising at Yanco Experiment Farm, where seed was increased for field testing. Monroe, from the United States Department of Agriculture, created a favourable impression at Yanco. It produces small, white beans of a type suitable for baking.

Variety Trial.—In a replicated trial of King Green, Processor, Streamline, Tenderlon and Seminole at Yanco Experiment Farm, Processor and Seminole gave the highest yields and the best canned product. Seminole was also considered superior to Landreth Stringless Greenpod in yield and canning quality.

Bean Transport and Marketing Tests.—Four varieties, Brown Beauty, Tweed Wonder, Wellington Wonder and Windsor Longpod, produced on the Terranora Demonstration Plot, near Murwillumbah, were included in test consignments in October to determine (a) the cause of "dryness" of beans on arrival at the Sydney Market and (b) the most suitable variety for rail transportation from Murwillumbah to Sydney.

"Dryness" is the agents' term to describe beans which are puffy, and not solid, to the touch. Apart from possible varietal differences, this condition is associated with maturity, time of harvest, and the period elapsing between picking and marketing. Three different grades of each variety—young, old, and moistened—were included in the test.

Of the beans picked and despatched during the cool weather, Wellington Wonder was given the highest rating by Sydney agents; and young beans were preferred to the old. Young beans of Brown Beauty received second preference, while the samples of Tweed Wonder and Windsor Longpod opened up in fair condition and were quite acceptable.

None of the moistened samples secured favourable mention and, in fact, moistening caused a deterioration in the quality of all consignments.

Brown Beauty was preferred to other varieties in the consignment picked and despatched in warm weather. The pods were firm and solid. In other varieties the flesh appeared to dry out, leaving side wall fibre, and air spaces, and the seeds in an air pocket.

Seed Production.—The French Bean Seed Certification Scheme continued, with seed producers' unabated interest. Seven hundred and eight acres were entered for Certification, by 67 growers; compared with 385 acres, 44 growers, in 1955; and 445 acres were provisionally Certified; compared with 329 acres in 1955. The acreage Certified included 357 acres of Brown Beauty, for an estimated yield of 1,145 bushels of seed, Hawkesbury Wonder 129 acres (420 bushels), Wellington Wonder 73 (125), Tweed Wonder 44 (320), Landreth Stringless 40 (15), Windsor Longpod 33 (30), and Richmond Wonder 5 (5).

Continuous wet weather, and autumn floods, destroyed or damaged many crops. Consequently, the quantity of Commercial seed marketed will be less than the 2,245 bushels of last year.

Green Peas.

Breeding.—Breeding of improved varieties of peas, for market and processing, advanced a further stage at Hawkesbury Agricultural College and Yanco Experiment Farm.

Several crosses of Greenfeast, Little Marvel, and Canner 75, with super Alaska No. 30 were promising in the 4th generation, at Hawkesbury Agricultural College. Nine crosses in F₂ generation were grown and seed harvested.

At Yanco, several Greenfeast crossbreds in the second generation were selected. The cross Greenfeast x Wando was promising because of concentrated maturity and large pods. Another crossbred, Austrian Winter x Radium, in F₂ generation, was also interesting, because of good seed colour, vigour, and large number of peas per pod.

New crosses effected were Greenfeast x Edible Podded Pea, Austrian Winter x New Era, and Austrian Winter x Canner No. 75.

Introductions.—Of the many introduced varieties, the most worthy of notice were Pluperfect, Hardy, Dark Seeded Perfection, Dark Green Perfection, and Shoshone, all from the U.S.A.

Variety Trials.—Ten of the most promising as canning varieties were compared in a replicated trial at Yanco Experiment Farm. There was a significant difference in yield between Hurst House, Epicure, Perfection 4022, Witham Wonder, Canner No. 75, and Canner L99. Hurst House produced the highest yield of shelled peas. All varieties were canning tested by the Leeton Co-operative Cannery and found to be satisfactory.

Seed Production.—The most promising varieties were seed-increased at Yanco for further testing.

Agricultural Extension Grant Demonstrations.—Demonstration of pea seed production in wheat districts have been spoiled by the adverse seasons. Of four demonstrations only one, at Inverell, produced a reasonable crop. Wet weather caused such heavy weed growth that the other crops could not be harvested.

Rockmelons.

Breeding.—Only one cross, PMR 45 x Rio Sweet, survived; of several made in the glasshouse at Yanco Experiment Farm. This crossbred demonstrated good resistance to powdery mildew and some resistance to downy mildew in tests of a number of varieties at the Gosford Citrus Experiment Station.

Introductions.—Of the introductions tested, Delicious, from U.S.A., has satisfactory prospects because of its early maturity and good flavour, and its reputed resistance to fusarium wilt.

Variety Trials.—Four varieties, Rio Gold, Rio Sweet, PMR 45, and Hales Best, were compared at the Gosford Citrus Experiment Station. There was little difference in yield, but Rio Sweet appeared more resistant to downy and powdery mildew. Rio Sweet also produced good quality melons and revealed high resistance to disease in a test at Tumut.

Carrots.

Introductions.—Of the introductions, Gold Spike, from U.S.A., was promising at Hawkesbury Agricultural College. It produced long, tapering, smooth roots of an attractive golden colour and is very suitable for bunching.

Seed Crop Insecticides.—In tests of the value of applying insecticides to seed crops, plots treated fortnightly with systox (0.025 per cent.) were markedly superior in growth and showed less insect damage than those to which a 2.5 per cent. nicotine dust and a 0.1 per cent. DDT spray were applied at the same frequency.

Crucifers.

Introductions.—Many varieties of cabbage, cauliflower, and sprouting broccoli were under observation. The most promising were Wisconsin Hollander (for Sauerkraut) and Gills Oregon Ballhead cabbages, both from the U.S.A.; Frickers' Original cauliflower from Switzerland; and Waltham 29 sprouting broccoli from the U.S.A.

Cauliflower Fertiliser Trial.—Analyses of leaf tissues from cauliflower grown on alluvial soils at Bathurst showed a marked deficiency of potash. Subsequent field tests with various fertilisers and mixtures supported the probability that cauliflowers grown on such soils will respond to potash applications.

Onions.

Hybrid Objective.—A project was initiated at Hawkesbury Agricultural College to incorporate the male sterile factor into the variety Hunter River Brown for the production of a hybrid suitable for local conditions.

Introductions.—Of nineteen introductions tested, Granex, an American hybrid, was outstanding. Parent stocks are being maintained.

Cucurbits.

Introductions.—At Hawkesbury Agricultural College, Buttercup pumpkin, from the U.S.A., returned a good yield of small pumpkins with an excellent flavour.

Butternut squash, from the U.S.A. was very productive of pear-shaped fruit of good culinary quality, at Yanco Experiment Farm and Hawkesbury Agricultural College.

Niagara cucumber, from the U.S.A., was the most outstanding of several new cucumbers tested. It is a dark green, slicing type, producing straight fruits, 10 to 11 inches long. York State Pickling, from the U.S.A., was very promising, giving a prolific yield of attractive gherkins.

Watermelon introductions were destroyed by hail storms at Hawkesbury Agricultural College and Yanco Experiment Farm.

Lettuce.

Introductions.—Of the twenty-two under observation at Hawkesbury Agricultural College and Yanco Experiment Farm, Pennlake and Jade, both from the U.S.A., were the most impressive.

Miscellaneous Vegetables.

Comet radish from the U.S.A., was outstanding for bunching. It produces scarlet, globular roots with a solid white flesh.

Utah 10B celery, from the U.S.A., favourably impressed at Bathurst Experiment Farm. It produced a large number of petioles and is a good green celery.

Miscellaneous Experiments with Vegetables.

Soil Blocks for Seedlings.—Experiments at Bathurst Experiment Farm with soil blocks made by a hand press, showed that tomato seedlings pricked out into blocks when a week old and later planted out in the blocks, were not affected in any way by the transfer. Moreover, the crop matured a fortnight earlier and produced a heavier yield of fruit than tomatoes grown from seedlings propagated by the usual method.

Molybdenum Treatment of Seed.—In tests at Griffith, significant results were obtained by soaking rockmelon seed in solutions of pure sodium molybdate of varying strengths before sowing. Pronounced responses were secured by soaking the seed for twenty-four hours in solutions of pure sodium molybdate at $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, and one pound per gallon. Promising results were obtained with a weaker solution, one ounce to 10 gallons, soaking the seed for half an hour.

Confirmatory tests are planned for next season. Success of the molybdenum seed treatments would be important. The method would facilitate, and considerably reduce the cost of application.

Pastures.

GENERAL.

Increase in Sown Areas.—The increase in pasture sowings, a feature in recent years, continued. The acreage of improved pasture sown in New South Wales in the twelve months to 31st March, 1956, was 850,000 acres, bringing the total to almost 7,000,000 acres whereas there were about 2,750,000 sown pasture acres in 1946-47. Of the 7,000,000 sown acres some 3,710,000 are topdressed.

Agricultural Extension Grant Demonstrations.—The number of pasture demonstrations under the Agricultural Extension Grant is now 217, compared with 103 in 1955. Field days were held on various A.E.G. demonstrations during the year.

Farmers' Experiments.—The numbers of experiments and demonstrations established on farmers' properties from Departmental funds remained constant, but there have been changes in several instances from simple demonstrations to more complex trials, of investigational character, requiring closer supervision by field officers and collaboration with the chemists and biologists of Division of Science Services.

INVESTIGATIONS AND RESEARCH.

Pasture Species.—The recent pasture development in New South Wales has been possible by widespread use of very few species. Their apparent adaptation has been widened by the unusual run of favourable seasons. However, in many sections, the north and central west, the north coast, and the drier areas of the south-west, pasture development is restricted by lack of more suitable species. Species work is therefore essential to development of these areas. It is prominent in pasture investigations at Grafton, Trangie, Condobolin and Yanco Experiment Farms.

At Grafton, the emphasis is on summer legumes. Of these, *Desmodium uncinatum*, *Stylosanthes gracilis* and *Phaseolus lathyroides* are showing considerable promise. The last-mentioned will be included in a district demonstration area during the coming season.

Several otherwise promising sub-tropical legumes have poisonous properties and, at Grafton, guinea pigs are now in use in toxicity-feeding trials.

Amongst summer-growing grasses *Setaria sphacelata*, *Paspalum* spp. and a strain of *Cenchrus ciliaris* are outstanding.

Superior winter- and spring-growing species also are urgently required for the north coast. Of those under trial *Phalaris*, and white clover strains of Mediterranean and South-Eastern U.S.A. origin, are the most promising.

In inland areas, at Trangie and Condobolin, *Stipa hyalina*, *Cenchrus ciliaris* f. *stolonifera*, *Panicum antidotale* and *Panicum coloratum* are proving valuable perennial, summer species. They are expected to prove useful in large areas of the central- and north-west.

In the dry south-west the problem is more difficult, because of lack of summer rainfall, but *Psoralea bituminosa*, a legume which has also done well at Trangie and Condobolin, and *Stipa hyalina*, stand out as possible sources of summer feed. Amongst winter growers, *Vicia dasycarpa* and *Lathyrus sativus* are best.

Nurseries.—The pasture species nurseries have been maintained at Bathurst, Leeton, and New England Experiment Farms and at Hawkesbury Agricultural College.

At Glen Innes (N.E.E.F.), strain trials, notably with selections of *Phalaris*, have been commenced.

Pasture Plant Breeding.—This has been discontinued for some years past because of staff shortages, but a lucerne breeding programme under the direction of the Wagga Agricultural Research Institute is proceeding at Temora Experiment Farm.

Pasture Nutrition.—Phosphate and nitrogen deficiencies have long been recognised in most New South Wales soils. Recent research has added molybdenum and sulphur to the established deficiencies in certain areas. Molybdenum, in molybdenised superphosphate, is now widely used in southern, southern tablelands, and coastal districts.



Pasture Species Toxicity Trials.

Pasture development in areas hindered by lack of superior species will be advanced by the pasture plant studies at Grafton, Trangie, Condobolin and Yanco Experiment Farms. At Grafton, with emphasis on introduced sub-tropical legumes, some of which may be toxic, the studies are now aided by guinea pig feeding trials.

(Photo from Grafton Experiment Farm.)

Some forty-five plant nutrition trials throughout the State have been surveyed. In these trials there were thirty-five responses to superphosphate, eleven to molybdenum, eight to heavy lime dressings and eleven showed improved nodulation as a result of light dressings of lime.

Sulphur deficiencies have been demonstrated by the Department in "problem" soils at Capertee and Walcha and also on a black basalt soil at Glen Innes. In the Glen Innes area the soil apparently supplies adequate phosphate but is lacking in sulphur and boron; and it appears that gypsum in lieu of superphosphate may be satisfactorily used as a fertiliser.

On other soil types deficient in sulphur, it is necessary to supply phosphate liberally before the sulphur deficiency will show up; and on these soils superphosphate appears the ideal means of supplying both elements.

Further work is required to determine the extent to which gypsum may be used to replace superphosphate.

Legume Inoculation.—Australian agriculturists have relied on legumes to supply the nitrogen needs of pastures but are recently aware that nitrogen fixation in the legumes is limited, because of poor nodulation. Considerable work has been done on *Rhizobium* strains, and rates and methods of applying lime. Success with low quantities of lime, 2 cwt. per acre, has been followed by pelleting the legume seed with lime.

Recent Departmental trials have shown that successful nodulation can be obtained with this very low rate of lime in intimate contact with the seed. Already the technique has been used commercially in one case of aerial sowing, which should facilitate this method of pasture establishment.

In this report, in Bacteriological section of the Biological Branch, Division of Science Services, there is further reference to the Department's *Rhizobium* research.

Despite improved growth and efficiency of legumes, there is increasing belief that "bag" nitrogen, despite its cost, has a place in New South Wales pasture management. Promising results have followed the use of nitrogenous fertilisers in trials at Murwillumbah, and at Berry. This research is to be intensified, facilitated by a grant from commercial interests.

Pasture Utilisation and Management.—Much of the recent research by the Department and other agencies has been concerned with pasture establishment, and much remains to be done in that field, but there is a perceptible shift of emphasis to problems of pasture management and utilisation.

GRAZING COMPARISONS.

At Temora Experiment Farm grazing trials yielded the following figures:—

- (i) Volunteer Pasture, 1.58 sheep per acre; Lucerne, 2.24 sheep per acre; Subterranean clover, 2.17 sheep per acre.
- (ii) Volunteer Pasture, 1.58 sheep per acre; Barrel Medie, 1.02 sheep per acre; Dwalganup sub. clover, 2.03 sheep per acre; Bacchus Marsh sub. clover, 2.26 sheep per acre; Clare sub. clover, 2.90 sheep per acre.

At Hawkesbury Agricultural College, gains averaging almost 2 lb. per day were made by beef cattle strip-grazed on irrigated pastures at four beasts per acre over twenty-five days and with twenty-five days pasture recovery periods.

Other trials involving measurement of pasture production in terms of stock and stock products have been planned for New England and Wollongbar Experiment Farms.

EXTENSION SERVICE.

The demand for information on pasture matters resulted in district agronomists devoting a major part of their time to advice on this phase of agriculture, embracing many trials and demonstrations involving species, fertilisers, including minor elements, inoculation and lime usage.

SEED TESTING, AND REGULATORY WORK.

Seed Testing Laboratory.—The testing laboratory staff was again increased, bringing the total to fourteen, an increase of 100 per cent. in two years. In addition, a junior clerk was attached to the laboratory.

The numbers of samples received in the two years are tabulated:—

Source.	Samples 1954-55.	Tests.	Samples 1955-56.	Tests.
Export and Import	475	950	559	1,122
Certified and Registered Seed	426	2,638	756	5,556
Inspectors under the Act.....	7	46	42	299
Wallangarra	562	1,124	364	623
Other Sources	1,258	5,007	883	4,831
Total	2,728	9,765	2,604	12,431

These figures reveal a slight overall decrease in 1955-56 but increases under headings other than "Wallangarra" (inspections under Stock Foods and Medicines Act) and "Other Sources" (farmers and seed merchants). In effect, the laboratory's activities are now concentrating on the more important fields.

The number of samples of Certified Seed, greatly increased, would have been much greater still, but for (i) failure of the Certified French Bean Seed crops and (ii) the fact that most maize tests were done by Andersons Seeds Ltd. laboratory. The samples in the "Certified" group comprised subterranean clover, white clover, and *Phalaris*; almost exclusively.

Despite the slight overall reduction in number of samples the volume of work, as indicated by the number of tests (9,765 vs. 12,431), considerably increased; largely by amendments to the numbers of samples in each group.

Prosecutions of Vendors.—Four seed vendors were prosecuted for infringements of the Agricultural Seeds Act, with verdict in favour of the Department in each case; and six cases are pending, on information laid in 1955-56.

Inspections of Seed Stores.—Sixty-seven towns were visited by the inspectors (two) under the Agricultural Seeds Act; over 500 stores were visited. In the metropolitan area some 300 stores were inspected.

Stock Foods and Medicines Act.—Following investigations into the alleged sale by the Wheat Board of feed wheat containing a high percentage, 13 per cent. by weight, of Mexican poppy seed, the Wheat Board paid £80 compensation to a poultry farmer for reduced egg production.

Weeds.

GENERAL.

Serrated tussock was the focal point of the Department's weed research and extension activities; and, in addition, many Shires and County Councils concentrated their efforts towards control of this pest. Minor new infestations were found in two centres on the northern tablelands, and significant new infestations were noted in the Mudgee and the Moss Vale districts. The discovery of further infestations on steep country not suitable for pasture improvement has emphasised the need for a special approach to this aspect of the problem.

Co-operation with Local Government.—Councils' interest in weed control has increased. Frequent requests have been received for officers to attend meetings and provide information on noxious plant control. One new Weeds County Council, Berrima, has been formed.



Rich Pasture Replacing Serrated Tussock.

Twenty-nine such demonstrations, of 20 to 40 acres each, have been set up on the central and southern tablelands to stimulate interest in improved pasture as a counter to Serrated Tussock (*Nassella trichotoma*).

(Photo from Western Region.)

Once again, £20,000 was made available by the Department of Local Government to assist Councils in noxious plant control, the Councils being required to supplement any grant £ for £. On the recommendation of the Division of Plant Industry as approved by the Minister for Agriculture and Food Production, the grant was distributed as follows:—

- 9 County Councils (comprising 35 shires and 12 municipalities)—£13,900.
- 32 Shires, £5,340.
- 10 Municipalities, £760.

The demand by Councils for assistance has been such that applications from 33 Shires and 4 Municipalities, received in the latter part of the year, have been deferred for consideration in 1956-57.

Weeds Revision Conferences for three groups of Shires and Municipalities were held at Bega, Glen Innes, and Yass. As a result, some changes are being made in plants declared noxious in the respective areas.

Agricultural Extension Grant Affect.—Twenty-nine demonstrations have been established on the central and southern tablelands to demonstrate the control of serrated tussock by improved pastures. They are mostly 20 to 40 acres in extent and have proved most successful in controlling tussock. They have also stimulated a considerable extension of pasture improvement as a control measure for serrated tussock.

The Mobile Weed Spray Unit promoted a further series of demonstrations, in many parts of the State. These have proved valuable extension work.

Cine films on serrated tussock and skeleton weed control were virtually completed, and will be available to district agronomists for screening during the spring of 1956.

INDIVIDUAL WEEDS.

Serrated Tussock (*Nassella trichotoma*).—An agronomist was appointed to specialise in research on serrated tussock, and several trials have been undertaken on heavily infested land in the Rockley district, with emphasis on methods for country too difficult or impossible to cultivate.

Progress has been made. Of particular interest is the extent of control in one area by a vigorous, ungrazed pasture. Work with herbicides has shown a new one, dalapon, to be very promising; but cost is such that it would have a minor role in the overall, tussock control programme.

St. John's Wort (*Hypericum perforatum*).—This serious perennial is spreading in many areas, mainly through the favourable recent summers. The Chrysomelid beetles are exercising useful control in old infestations at Mannus, Blowering, Sodwalls, and Orange, but not in the affected drier areas, such as Mudgee, nor in isolated patches. 2, 4-D and pasture improvement have proved useful and are being used extensively. There is room for wider adoption of recommended control methods.

Crofton Weed (*Eupatorium adenophorum*).—The stem gall fly continued to spread rapidly on the far north coast, and it is difficult to locate a patch of crofton weed free of galls. It has also spread well on the central coast. However, parasites of stem gall fly have so built up that benefit from stem gall fly will be greatly reduced.

Noogoora Burr (*Xanthium chinense*).—This annual, summer-growing species has been particularly widespread, and alarming, in recent years. Very heavy infestations, some millions of acres, occur on north-western slopes and plains, and far north coast, and considerable increases have occurred in southerly areas, including Junee and Berrigan.

Spraying has been undertaken with good results, but repeated germinations have frequently necessitated two or three sprays in the one season.

Paterson's Curse (*Echium plantagineum*).—It is increasingly important by invading improved pastures, particularly subterranean clover, after soil fertility has built up. It is troublesome on granite soils and where cattle are the main grazing stock. The Riverina is most affected.

Provided it is sprayed in the early rosette stage with 2,4-D, preferably in the ester form, a good kill is usually obtained with 6 to 8 oz. per acre. In some cases as low as 4 oz. per acre has been satisfactory. Establishment of a perennial grass in the pasture has also provided control.

Skeleton Weed (*Chondrilla juncea*).—Skeleton weed has been less important in recent years, due to (a) reduced area cropped, (b) high fertility of land now used for cropping, and (c) 2, 4-D spraying of cereal crops, in conjunction with improved pasture sowings.

Because of unfavourable ground conditions about 3,000 acres of wheat were sprayed from the air with 2, 4-D for skeleton weed control. In the Wagga district, 35,000 to 40,000 acres were sprayed with 2, 4-D, most farmers using their own low-volume spray units.

Thistles.—The various annual thistles, saffron, variegated, black, and scotch, in particular, continued to increase because of favourable conditions for growth and by invasion of the increasing areas of improved pasture.

Greater areas are being sprayed with 2, 4-D, particularly in irrigation areas. There, under the improved fertility conditions, scotch thistle unfortunately is not readily controlled by spraying. It, as is the case with other thistles, demands the long term approach; control through a perennial grass in the pasture.

Irrigation.

Though the year's rain was above average many farmers sought advice on installation and use of small spray irrigation plants, especially in the Central Division.

An inter-Departmental Committee, between this Department and the Water Conservation and Irrigation Commission has been established to plan an irrigation investigation programme. In addition, an officer of the Division of Plant Industry is undertaking special studies at the N.S.W. University of Technology, as a basis for future irrigation research.

INTER-DEPARTMENTAL COMMITTEES.

The Department's special agronomist (irrigation) represents, in a number of inter-Departmental Committees concerned with irrigation, floods and similar matters, as follows:

Hunter Valley Conservation Trust.—Eleven ordinary meetings and one special meeting were held, and three inspections of work were made in the Hunter Valley. The Trust has agreed to subsidise much of the work proposed by the Committee of Advice on Flood Mitigation (see after) for alleviation of floods in the valley. It has also made considerable rebates to individual farmers carrying out soil conservation and river bank improvement.

Tullakool Investigations Committee.—This committee, appointed by the Minister for Conservation to advise on the rehabilitation of settlers in the Tullakool irrigation area, established principles to be followed.

Committee of Advice on Flood Mitigation.—This special Committee, appointed by Parliament after the disastrous floods of 1955, to date has presented six interim reports to the Premier. Action was taken by the Minister for Conservation towards the end of the year to introduce a Bill into the House to enable work to be carried out in the Hunter Valley, as recommended in the Committee's No. 2 Report. Several inspections of the Hunter, Macquarie, Bell and Castlereagh Rivers have been made by the Committee, various proposals have been considered, and recommendations have been made for the alleviation of flooding.

Abermusden Committee.—This is a joint Committee of the W.C. and I.C., Department of Agriculture, Department of Lands, and Premier's Department, to make recommendations regarding use of Glenbawn Dam waters. An intensive inspection of the proposed Abermusden irrigation district was made by a Committee.

Blowering Dam Committee.—This Committee, representative of a number of Departments and the C.S.I.R.O., has examined many proposals for use of the Snowy River water to be diverted into the Murrumbidgee River. A full report was presented to the Minister for Conservation, covering proposals for new irrigation areas in the Murrumbidgee Valley, and use of water double the quantity now available in the Murrumbidgee.

The Macleay County Council Flood Mitigation Committee.—This was formed to carry out a flood mitigation programme in the Macleay Valley, as recommended by an inter-Departmental Committee. Representation in this Committee is by the Kempsey district dairy officer, Mr. J. Wilson, who, during the year, succeeded the special agronomist (irrigation). The Committee's activity is being watched with interest, as it could provide a pattern for future similar work.

IRRIGATION AT COLLEGES AND EXPERIMENTAL FARMS.

At Hawkesbury Agricultural College, apart from using drainage from the College for irrigation of dairy pastures, a programme of construction of water storages has commenced. The first step is a ring tank to store over ten million gallons. The special agronomist (irrigation) has been advisory to the College Principal.

At Wagga Agricultural College, small irrigation projects from stored water or from the creek which runs through College property are proposed. Arrangements are in hand with the W.C. & I.C. to make a survey and submit a development plan.

At Gosford Citrus Experiment Station a survey was carried out, and arrangements were made for an inspection by the W.C. & I.C. A report was submitted concerning development of initial irrigation, primarily for seed-bed work. A more comprehensive scheme will be submitted to enable irrigation of a larger area.

IRRIGATION SCHOOLS FOR FARMERS.

Three short-term irrigation schools for farmers were held at the Yanco Experiment Farm. Each school was of eleven days duration and was attended by twenty-five farmers or pastoralists. The schools centred on "Irrigation for Pastures and Livestock Husbandry".

DAIRY FARM IRRIGATION DEMONSTRATIONS.

As reported last year, demonstrations on water storage and spray irrigation were to be established on coastal dairy farms in co-operation with the Commonwealth Trading Bank. To date, none has been established, mainly due to unsatisfactory sites or excessive costs. The project is continuing.

FARM WATER SUPPLIES ACT.

Under this Act, where the subject of an application received by the W.C. & I.C. is estimated to cost over £1,000 the proposal is examined and reported upon by the Department of Agriculture. Reports, received from the respective district agronomists are examined by the special agronomist (irrigation) prior to forwarding to the W.C. & I.C.

QUARTERLY IRRIGATION NOTES FOR FIELD OFFICERS.

Preparation and dissemination of irrigation notes to agronomists, other interested departments, machinery firms, etc., as is done by other specialists of the Plant Industry Division, were commenced this year. Initially, the distribution was 300 copies but the demand is steadily increasing. The aim is to issue these notes on a monthly basis, in due course.

PROPOSALS FOR KEEPT DAM WATERS.

Land use in the north-west in relation to irrigation by waters to be stored by Keesit Dam, has been under attention. An approach was made by the W.C. & I.C. for advice on agricultural development. This led to a joint visit to Queensland to investigate cotton growing, with a view to the possibilities of this crop in the irrigation farming programme of the north-west.

A special allocation from the Treasury to this Department is required for intensive irrigation investigations in the north of the State, so that the W.C. & I.C. may be given timely advice as to the irrigation farming programme and practice for that section.

War Service Land Settlement.

Because of the intense activity in War Service Land Settlement, it was necessary to re-establish a full time officer for this section of the Plant Industry Division's work.

The financial agreement now existing between the Commonwealth and States, and the recent amendments to the War Service Land Settlement Act enabling properties to be acquired at their true market value, have resulted in considerable expansion. An indication of this is conveyed by the following figures:—

Single Farm Promotion Applications.—In the six months June to December, 1955, the applications totalled 166, and in the five months January to May, 1956, they totalled 254; 420 for the eleven months. The figures represent a 200 per cent. increase by comparison with 1954-55.

The total of applications for farms under the Promotion Scheme to 31st May, 1956 is 2,584; of which 1,657 were refused as unsuitable. The remainder have been acquired or are in the process of being acquired.

The number of settlers established under the Promotion Scheme to 31st May, 1956 is 1,235; a combined area of some 1,415,465 acres and purchase expenditure of £9,056,124.

Indications of the distribution and proportions of below-standard farms subject of applications under the Promotion Scheme, are provided by the following figures relating to inspections completed by district agronomists during the most recent six months:—

District Agronomist.	Inspections completed.	Not recommended.
Lismore	9	8
West Wyalong	9	6
Mudgee	11	6
Grafton	6	5
Armidale	7	2
Orange	12	8
Tamworth	14	12
Maitland	7	2
Dubbo	10	4
Kyogle	9	4

Restriction of finance from outside sources for property purchases, has helped to stimulate the number of applications made under the Promotion Scheme. The applications over the five months to May, 1956 averaged approximately 50 per month.

Acquired Estates.—Renewed interest was apparent in the acquisition of large estates. Twenty-one property resumptions were effected. All but four of the twenty-six properties which were the subject of negotiation as at 30th June, 1955, were purchased by the 31st May, 1956.

Estates acquired for ballot, comprise an area of approximately 1,284,224 acres, involving a compensation expenditure of £8,204,703 to the owners.

To 31st May, 1956, a total of 1,076 settlers had been placed on their farms by ballot, compared with 959 in the corresponding period of the previous year.

The rate of ex-servicemen's applications for admission to ballots for acquired estates shows a little diminution. The average number admitted to the last ten ballots conducted was 1,029, compared with an average of 1,052 admitted to the first ten ballots, in 1950.

Settlers Established.—The farms acquired under the Promotion and Acquired Schemes now total 2,314, involving 2,699,689 acres. Progress of establishment can be gauged by the following:—

Established at 30th June, 1949—1088.

Established at 30th June, 1951—1569.

Established at 30th June, 1953—1872.

Established at 30th June, 1954—1937.

Established at 30th June, 1955—2115.

Established at 31st May, 1956—2314

Settlement in Conjunction with W.C. & I.C.—The Department of Agriculture has worked in close co-operation with the W.C. & I.C. in the acquisition of estates in irrigation areas. Department of Agriculture officers assisted in the design of thirty blocks on part of the "Kooba" Estate, near Whittton, for which a ballot was recently conducted. This involves an extension of the Murrumbidgee Irrigation Areas.

Department of Agriculture officers' advice were sought also on the design and establishment of twenty-five horticultural farms and five dairy farms in the Buronga Irrigation Area, to be proclaimed on the Victorian border adjacent to Mildura.

W.S.L.S. Extension Service.—District officers continued in their advisory role with new settlers, many of whom, in new surroundings and district conditions, accept the field officer as guide and philosopher. The district and individual contact service have contributed in no small measure to the success of soldier settlers.

Settlers in Tullakool Irrigation Area.—The inter-Departmental Committee appointed by the Minister for Conservation, to inquire into the Tullakool Irrigation Area Settlement and in which the Department of Agriculture was represented, was disbanded during the year. Re-establishment of six settlers from the Tullakool area on new farms set aside on "Kooba" estate, and re-allocation of their vacated farms to remaining settlers, were suggested to and adopted by the Water Conservation and Irrigation Commission.

DIVISION OF HORTICULTURE.

Regulatory.

PLANT QUARANTINE.

Importations of overseas plants and plant products were examined for the Commonwealth Department of Health in accordance with the Quarantine Act.

Seed.—The quantities of flower and vegetable seed imported remained at rather high levels throughout the year. The main supplies were from New Zealand, U.S.A., and Holland with smaller quantities from the United Kingdom and France. Carrot seed from U.S.A. and Holland in several instances required re-cleaning for weed seed, and other lines were fumigated for insect infestation. The usual large quantities of grass seed and pea seed were imported from New Zealand. Some consignments of grass seed were re-cleaned for prohibited seed and various weed seed, and some lines were fumigated for insect infestation.

Nursery Stock.—Importation of living plants remained at a rather low level, with an occasional large consignment of indoor ornamental and foliage plants, mainly from Honolulu, Fiji, United Kingdom, France and Holland. Ixora plants from Fiji certified as apparently free from disease were found heavily infested with root nematodes; hibiscus plants from Honolulu were found to be similarly affected, and a later parcel from the same origin was infected with a leaf virus unknown in Australia. One large consignment of ornamental trees and shrubs was received from Holland in very good condition and passed inspection.

Orchid Plants.—Orchid plants were chiefly from the United Kingdom, Hawaii, Holland, France, Brazil, India and New Guinea. Consignments were smaller than in previous years.

Bulbs, Corms, Tubers.—Some large consignments were imported, totalling 116,250. Hyacinths from Holland were fumigated for mite infestation; 800 dahlia tubers and 2,000 tuberous begonias arrived from the same country, and 1,000 begonias from Belgium. Some 40,000 lily bulbs from Japan were packed in dry soil which had to be removed and dumped at sea.

Basketware and Rattan Cane.—Several consignments of bamboo rakes and handles from Japan were enclosed in second-hand potato bags, which are prohibited and were removed and destroyed. From Malaya considerable rattan cane and furniture were imported; some consignments were showing active borer and were treated under supervision.

Passengers' Baggage.—Inspection was made available during Customs examination of all passenger ships. A large quantity of prohibited and infected goods was detained for destruction or treatment. Much of the plant material was brought in by passengers on Italian vessels.

All plant material coming by overseas air passengers was submitted by the Customs officers for our inspections.

Parcels Post.—A constant inspection service for plant material from overseas was maintained at the Parcels Post Office, and all interstate parcels of bulbs and plants, etc., forwarded to New South Wales were inspected. Certificates were issued for outgoing plant material, interstate and overseas.

Incoming overseas parcels examined totalled 10,020 of which 3,532 were detained for treatment or destruction as the case required. Articles detained included plants, raw cotton samples, prohibited seed, hops, bulbs, insect infested goods, woodwork and wooden boxes containing active borer, straw packing, etc. Much of this material was forwarded on after treatment but prohibited goods were detained and addressees notified.

Timber.—Importation of timber both in sawn and log form amounted to some 160,000,000 super. feet, some 30,000,000 below last year's record import. Sawn timber amounted to 144,000,000 super. feet, two-thirds of which was Douglas fir from North America, and the balance was chiefly Parana pine from South America, *Pinus radiata* from New Zealand, and Meranti from Malaya and Borneo. Log timber was consigned principally from Borneo, Indonesia and the British Solomon Islands. Infestation was found in a consignment of red cedar and in some logs from Borneo and New Guinea, all of which were treated under supervision.

Sirex Wasp.—A continual examination of all cargo discharged from overseas vessels was maintained for the detection of sirex wasp and other wood-boring insects in cases, crates, or other timber cargo packing. From November, 1955, to May, 1956, approximately 16,000 cases, crates, and the like were quarantined and treated under supervision, principally for sirex wasp and longicorn beetle infestation. Records for the earlier months of the fiscal year were lost in the fire which destroyed the Day-street building.

EXPORT INSPECTIONS.

Exports of fresh fruits, flour, and rice, were inspected under the provisions of the Commerce (Trade Descriptions) Act.

Citrus Fruit Inspections.—Although an average crop was grown, export of Washington navel oranges was small, totalling 11,246 bushel cases; 9,424 cases were exported to Singapore, 763 cases to Colombo, 859 cases to London, and 200 cases to New Zealand. Owing to a fruit fly outbreak in the Murrumbidgee Irrigation Areas, New Zealand refused to import New South Wales citrus; only a trial shipment of 200 cases of precooled fruit was shipped. An attempt was made to revive export of navel oranges to the United Kingdom but the quality of fruit submitted was poor and only 859 cases were shipped. Frost damage and an outbreak of *Septoria* spot in the M.I.A. brought the export season of navel oranges to an early close.

Export of Valencia oranges commenced early in September and continued until mid-December. In all, 34,403 cases were shipped, the smallest quantity for years. The bulk of the fruit went to Singapore (28,565 cases), the remainder to Colombo and Aden. All but 700 cases packed at Gosford, were grown in the M.I.A. and were excellent quality.

Good quality M.I.A. grapefruit, 235 cases, were shipped to the north; 700 cases submitted for shipment to the United Kingdom were all rejected for *Septoria* spot.

Flour and Rice Inspections.—Exports of flour amounted to 198,527 short tons. Country mills supplied the bulk of the flour; July was the lightest month, 7,000 tons, and December the heaviest, 27,000 tons. The main exports were to Malaya, Indonesia, Ceylon and Pacific Islands. Generally the flour was well bagged in clean, once-used wheat or sugar bags, and new calico bags. Until November, 1955, very little infestation by insects was noted. In December some consignments were found to be infested with rust red flour beetle, and 236 tons were rejected. In January slight infestation was found, but not enough to warrant rejection. Ten tons were rejected during the year for dirty containers.

Rice exports totalled approximately 35,000 tons, an increase. The main destinations were Japan, Europe, Canada, New Guinea and nearby island ports. Japan accounted for approximately 6,000 tons, all of which was fumigated with methyl bromide at the mills before shipment.

CITY MARKET AND INTERSTATE SUPPLY INSPECTIONS.

Citrus Fruits.—In the 1955 season, navel oranges were in heavy supply until September. Coastal and South Australian fruit were high quality throughout, but Murray Valley and M.I.A. fruit suffered severe *Septoria* spot and frost damage towards the end of the season. Some Murray Valley consignments were heavily infested with red scale and were fumigated. Most of the 1956 season's navel orange crop from Queensland and New South Wales coastal districts were artificially coloured during March, April, and early May, but thereafter fair supplies of naturally coloured fruit of good quality were available and all lines tested for maturity complied with the required standard.

Coastal valencia oranges were in good supply although, from early summer, black spot was very prevalent. The crop from the M.I.A. was good quality early in the season, but red scale was present in a large percentage of the summer consignments, necessitating the fumigation of many lines before permission was granted for them to be sold. Late in the new year valencia oranges, including South Australian consignments, deteriorated rather quickly, apparently because of continued rain and warm, moist weather. Very few second-crop valencia oranges were marketed.

Adequate supplies of lemons and grapefruit were available throughout the year. Lemons from coastal districts were mostly Plain grade. The quality of both fruits from other areas was good.

Apples.—Practically all apples marketed from June to December, 1955, came from other States and, together with New South Wales-grown fruits, were mostly low grade and poor quality. Jonathan spot was particularly prevalent in Victorian Jonathan apples, and towards the end of the year the local Granny Smith apples mostly were showing severe scald. New-season coastal early varieties available in late December were of poor quality, but they sold freely. From mid-January better quality Gravenstein and McIntosh apples were marketed, followed by inland red varieties and by Granny Smith from the M.I.A. Supplies began to lessen in May, 1956, and by the end of that month very little New South Wales fruit was on the market. Only a small percentage of New South Wales-grown fruit was marketed under Fancy grade, due to widespread hail damage and black spot.

On inspection of Tasmanian apples during July, 1955, the eggs of the European red mite were found in a few consignments. This infestation became almost general in later Tasmanian shipments. It was decided that each grower's consignment so affected be fumigated with methyl bromide. Early in August two part-shipments were fumigated, and by the middle of the month infestation was so general that all apples from Tasmania were subject to fumigation. The quantity which arrived in the six months ended December, 1955, amounted to approximately 185,000 cases, of which some 12,800 cases were fumigated.

This season arrangements were formulated for inspection of the fruit at Tasmanian ports prior to shipment, and for the issue of certificates for consignments apparently free from red mite. On inspection of the consignments at Sydney it was found that the certificates, in the main, were accurate. Only 4,655 cases carrying certificates, out of a total of 91,000 certified, had to be fumigated for infestation. Shipments up to 31st May, 1956, amounted to approximately 155,000 cases; 64,000 were not certified and, with the 4,655 certified, brought the total fumigated to approximately 69,000 cases.

Pears.—The New South Wales 1955 crop was mainly Packham's Triumph. Some consignments showed scald and early breakdown. The crop was light, and hail damage appeared in fruit from all areas. As usual, Victoria supplied the bulk of inter-State fruit; supplies were light, and mostly of low-grade fruit which broke down rapidly late in the season. Many consignments of large Josephine pears showed internal breakdown, necessitating re-packing before sale. This season's crop, particularly of Williams and Packhams, is showing malformation and black spot.

Cherries.—A light crop was harvested both from Young and Orange districts. Quality was good and little fungal deterioration was present.

Apricots, Plums and Peaches.—This was one of the worst seasons known for these fruits, as rain and high humidity throughout the harvest period resulted in very heavy wastage in consignments from all districts.

Pineapples.—Last season's winter crop showed an appreciable amount of black heart. In January, 1956, it was necessary to withhold from sale a number of consignments from Magnetic Island, for immaturity. These were eventually used for factory purposes. Later in the summer heavy wastage occurred from yeasty rot and blister.

Strawberries.—Heavy supplies of Queensland strawberries were available from June to September, 1955. In addition to the usual chip punnet container, a large quantity of unsized berries was packed in $\frac{3}{4}$ -lb. and 1-lb. cardboard punnets which, in turn, were packed in cardboard cartons for forwarding. These containers proved popular with retailers.

Tomatoes.—Due to adverse weather, in New South Wales and Queensland, tomatoes were in light supply. Heavier supplies than usual were forwarded from Victoria, South Australia and Western Australia. In the main, inter-State fruit was good, as were the early lots of New South Wales-grown fruit. However, towards the last quarter, Irish blight was present in many lines, particularly from Bathurst and the M.I.A., and mosaic and stem-end decay were prevalent in fruit from near-Sydney areas.

Potatoes.—Consignments totalled 1,211,658 sacks from local and inter-State sources. New South Wales-grown amounted to 84,000 sacks, of which 7,150 were picked over under supervision for such reasons as wet and dry rot, potato moth, mechanical injury, etc., and 2,400 bags were degraded from No. 1 to No. 3 grade for hollow heart. The quality generally was not good and the branding of the bags poor. Tasmania supplied 775,358 bags; many lines showed Irish blight infection but only a small quantity seriously enough to have required reconditioning. Wet rot, apparently caused by broken tubers and aggravated by shipping delays, caused heavy losses in some shipments. Grading, and branding of bags, were satisfactory. From Victoria 306,500 bags and Queensland 44,200 bags were received; the quality generally, and the grading and branding, were good.

Onions.—Approximately 75,000 bags were inspected from inter-State sources; Victoria supplied 60,000 bags, all of which were good and sound.

Peanuts.—Of the 15,700 bags of peanuts inspected, ex road transport from Queensland, only a small number were found to be infested with moth larvae requiring fumigation.

Prosecutions and/or Warnings.—Arising from market inspections, detected offences reported for prosecution were: topping of carrots (16), topping or misdescription of tomatoes (54), topping of various others (6).

Inspection of City Fruit Barrows.—This was carried out regularly. Prosecutions were recommended for 15 offences.

Fruit Fly.—Fruit fly infestation was the lightest for many years in marketed coastal fruit, and mainly in late stone and pome fruit from only a few orchards. However, infestation was noted in fruit from many country centres, particularly the Bathurst district.

DISTRICT AND SUBURBAN INSPECTIONS.

Fruit Fly.—At Barham in the mid-Murray area, where fruit fly appeared in 1955, a very close watch on the town and surrounding district was continued throughout the year. An inspector was stationed at Barham for six months. Fruit fly traps have been continuously maintained and surrounding areas sprayed with D.D.T. Loquats were prevented from fruiting and a general clean-up was enforced. Fruit fly or larvae have not been found since May, 1955, in the mid-Murray area.

In the M.I.A. an outbreak of fruit fly occurred for the second year in succession, and again eradication was attempted by extension and inspection officers. The initial outbreak

occurred in Griffith backyards, and it was decided that Departmental staff should spray with D.D.T. all backyards within a radius of one-third of a mile from the outbreak. Subsequently, when close inspections showed the pest to be widespread in the M.I.A. other methods of attack had to be introduced. This year fruit fly eradication work has been conducted under the Plant Diseases Act instead of the Irrigation Act which was used in the 1954-55 clean-up. Thus some of the legal difficulties associated with operating under the Irrigation Act were avoided; and quicker, more simplified proceedings against non-co-operators were possible. In all, twenty-four prosecutions are now pending in connection with the 1955-56 fruit fly campaign in the M.I.A.

Quarantine and inspections under the Irrigation Act resulted in 131,000 fruit trees which entered the M.I.A. during the year being inspected and, in many cases, fumigated by Departmental staff.

Citrus Gall Wasp.—The campaign for eradication of this pest, occurring in the vicinity of Sydney, was continued. Fortunately, as yet there has been no recorded occurrence of the pest in the commercial citrus districts.

Banana Plantation Inspections.—Inspectorial work under the Plant Diseases Act was well maintained in all northern districts. Departmental responsibilities in directing the disease control scheme financed by the Banana Growers' Federation proceeded smoothly, although the work was affected to some extent by the flood rains of February-March, 1956. The incidence of bunchy top is at such a low level that no major outbreak occurred.

Plant Diseases Act Prosecutions.—Prosecutions were conducted under the Act, for offences including topping, misdescription of fruit, failure to control various pests and diseases, failure to keep plantations free of weeds, and selling fruit in unbranded cases.

Other prosecutions were conducted under the Irrigation Act, Fruit Cases Act, and Potato Licensing Act.

District, Potato Inspections.—Inspection of potatoes for the Potato Marketing Board and the Certified Seed Potatoes New South Wales Co-operative Ltd. has been on a reduced scale this year. A Potato Certification Officer was appointed, partly financed by the Co-operative Society. He carried out certified seed potato inspections for the Potato Marketing Board.

District Extension Work.

Increased interest by growers, and growers' organisations, in advice on all types of fruit production problems has been a feature of the year. The press, radio, field days, demonstration plots, and other means have been increasingly used by fruit officers. Demonstration plots have been laid down throughout the State; and campaigns and field days with special relation to the requirements of the respective district have been conducted.

Some of the respective district extension problems upon which extension officers concentrated, included:—

Murrumbidgee Irrigation Areas.—Improvement of the pome fruit export pack, better control of brown rot and rust on stone fruits and of red scale on citrus.

Murray River Settlements.—Control of black spot and downy mildew on grapes.

Orange.—More accurate timing of apple and pear black spot spray applications; also the advantages of chemical thinning and the technique of application.

Young.—The value of nitrogenous fertilisers to increase the yield of prunes in this district.

Batlow.—Continuation of the campaign for use of more economic spray programmes. The results of this campaign which has extended over three seasons are now showing, and growers are giving much closer consideration to their programmes.

New England.—Improved pruning methods.

Gosford.—Underground drainage; aided by the fact that waterlogging of orchards in recent years in this district has been more serious and frequent than for fifty years past. Resulting from this, emphasis during the year on the question of underground drainage has been the year's most important extension project.

Agricultural Extension Grant.—Ten projects are conducted by the Division of Horticulture under this Commonwealth Grant.

The services of the packing instructor, appointed under the Grant, are widely sought; and the project to demonstrate eradication of apple black spot at Yetholme is attracting widespread interest.

Research Orchards, Laboratories, and Advisory Committees.

Fruit Cool Storage Investigations, Advisory Committee.—The committee met twice. It reviewed the work carried on co-operatively by the Division of Horticulture and the C.S.I.R.O. Division of Food Preservation and Transport, on storage, and quick-freeze research, at the Homebush Laboratory of the C.S.I.R.O., the Plant Physiology Laboratory, University of Sydney, and the Department's Citrus Wastage Research Laboratory at Gosford.

This year a Technical Committee on Fruit Fly Investigations was formed to investigate methods of fly control to enable citrus export to the New Zealand market.

Fruit and Vegetable Processing Research Committee.—The Committee held two meetings, to review processing investigations by the C.S.I.R.O. Division of Food Preservation and Transport and the associated work by the Department. The Committee considered progress reports on growth rates and harvesting maturity of freestone peaches for canning, storage and ripening of canning fruits, preparation and processing of fruits for freezing, mould control and packaging of processed prunes, and the processing of berry fruits. Projected investigations were also discussed, and arrangements were made to facilitate them.

Commonwealth Dried Fruits Processing Committee.—The annual meeting was held in Adelaide in October, 1955 to consider technical matters referred to it by the dried fruits industries. Problems relating to stickiness in seeded lemons, sulphite dipping of sultanas, and sulphur dioxide content of dried fruits, were under attention. The Committee also discussed research projects proceeding in various States, concerning mould control in processed prunes, influence of dip on the seeding of lemons, sulphite dip for sultanas, and use of commercial dipping oil in sultana dipping. After considering reports, the Committee strongly recommended general adoption of standard drying methods.

New South Wales Canning Fruits Advisory Committee.—Representatives of canning-fruit growers and processing firms, under the chairmanship of an officer of this Department, form this Committee. It was set up by the canning industry to advise on canning-fruit planting requirements. The Committee constantly reviews planting trends in apricots, peaches and pears.

M.I.A. Canning Peach Conference.—A conference was held at Yanco Experiment Farm to enable M.I.A. fruit growers and canning interests to discuss with Divisional officers the merits of a number of clingstone canning peach varieties which are under trial. The field performance and canning quality of each variety were assessed in relation to the industry's needs. An outline of canning peach research in progress at Yanco, and details of planting statistics, were also presented to the conference.

Bathurst Experiment Farm Orchard.—A record crop was harvested from the apple rootstock trials. A great volume of data has been obtained from these extensive trials; and from apple pruning, pear rootstock, cultural, and fruit breeding experiments.

New England Experiment Farm Orchard.—Portion of the main orchard was uprooted and the area was prepared for experiments in rehabilitation of old orchard land before replanting. Extensive nursery investigations were planned but were set back by wet seasonal conditions.

Wagga Agricultural College Orchard.—Considerable data from pome and stone fruit experiments have been assembled for publication. A collection of plum stocks has been commenced, for an intensive study of the varieties, their propagation, and influence on scion growth.

Lower Murray Research Station Orchard.—Some 30 acres of land were cleared. Fixed overhead spray irrigation was installed on 25 acres, and water storage for domestic and garden requirements has been constructed.

The initial citrus plantings, comprising a commercial block of 6 acres and a collection of citrus strains and varieties of 93 trees, were successfully made in August, 1955. A nursery section has been prepared to receive seeds and rootstocks in the spring of 1956.

Yanco Experiment Farm Orchard.—Three acres were planted to valencia oranges, on several rootstocks, in Block 5. Existing plantings were maintained. Action has been taken towards providing an adequate irrigation service to the citrus plantings in the new horticultural area.

A small planting of valencia oranges is specially maintained at Leeton Experiment Farm for budwood supply purposes.

Gosford Citrus Experiment Station.—The Narara section is mainly concerned with fruit tree and vine propagation. Permanent plantings of citrus trees were maintained in furtherance of investigations. A close planting of 600 trifoliata selections was made for use in virus investigations. Mother tree plots have been increased to provide a readily available source of budwood for experimental propagation.

The provision of an adequate irrigation service was investigated by engineers of the Farm Water Supplies Branch of the Water Conservation and Irrigation Commission, whose reports indicated that only a limited supply could be obtained with the resources available.

At the Somersby section further planting brought the total citrus plantings to 1,200 trees, in field trials to investigate rootstocks, strains of rootstocks, and virus diseases, and to ascertain whether certain orange varieties are free from scaly butt. Five acres are in course of preparation for planting in the spring of 1956. Underground drains were extended as required.

Griffith Viticultural Nursery.—Soil salt has decreased the area of experimental plantings, but vine and citrus trials have been continued on the unaffected portion. Citrus plantings maintained a high level of vigour and were thinned out to provide better conditions for cultivation, irrigation and spraying.

Gosford Citrus Wastage Laboratory.—Operated jointly by the C.S.I.R.O. and this Department, the Laboratory continued investigations into the control of wastage in citrus fruits.

Gosford district packing houses' adoption of the sodium ortho-phenyl phenate rinse treatment, recommended by the Laboratory, proved worthwhile in the past season when conditions were particularly favourable for mould wastage.

The laboratory this year demonstrated the importance of applying the sodium ortho-phenyl phenate treatment before infections had entered the fruit too deeply. This means that treatment should be given within 36 hours of picking in summer, and within four days of picking in winter. Sodium ortho-phenyl phenate impregnated wraps are also under investigation.

The importance to lemons of a mid-February field spray of bordeaux mixture was demonstrated in the control of stem-end rot breakdown in stored lemons; while post-harvest dipping in a solution of 2,4-D and salicylanilide was shown to have advantages.

Other Research Plantings, Duranbah and other areas.—Progress at the Duranbah Plot and other experiment areas are referred to elsewhere in this report of the Division of Horticulture, together with the work of other research committees.

Citrus Fruits.

Two outstanding features of the past season were:—

Firstly, the Murrumbidgee Irrigation Areas growers' loss of the New Zealand export market, because of fruit fly; and the special inspectional conditions imposed by Victoria on New South Wales fruit consigned to Melbourne, which virtually excluded that market. The prices on local markets were consequently low, the reduction being estimated at 4s. per case.

Secondly, the excessively wet year, which imposed serious cultural difficulties on growers and adversely affected tree health in many areas.

CITRUS EXTENSION WORK.

Pest Control.—Fruit fly received unremitting attention, but control measures were seriously hampered by the continual wet weather. Red scale built up, because weather conditions interfered with control programmes, particularly in the western districts. In coastal orchards red scale was not quite so serious, though some heavy infestations were reported. White wax scale proved the major problem in coastal orchards and again the weather affected control measures. The presence of white wax scale was followed by sooty mould development and much coastal fruit was affected, presenting a special problem to private packers who do not possess efficient washing plants.

Citrus Spraying and Fumigation.—Because of labour difficulties, high cost of equipment, and prevalence of unfavourable weather, fumigation is steadily losing favour as a pest-control method. The advent of spray machines designed to apply sprays mechanically by boom or air blast has contributed to the greater use of sprays.

There is some dissatisfaction with spraying oil in western districts because of its effect on fruit colour and rind quality. Many growers are tending to include organic phosphates in the spray programme with a reduced amount of oil in attempts to overcome the disadvantage of full-length oil sprays.

Drainage.—Seasonal conditions highlighted the necessity for underground drainage in many coastal orchards, and the effect of high rainfall plus irrigation in creating high water-tables in the M.I.A. provided a similar problem.

In the M.I.A., deep draining is directed by a committee which fully investigates each farm before making a recommendation, but the coastal growers depend on the district fruit officer for guidance. Special finance is provided to cover drainage costs incurred by growers in the M.I.A., but no such provision is made in other districts.

In the past year drainage problems appeared on the Coomealla Soldier Settlement, on the Lower Murray, and considerable time has been devoted by district officers to providing the necessary survey designs.

Soldier Settlements in Citrus areas.—Fruit officers continued to act in the advisory committees functioning in respect to Soldier Settlements at Coomealla and Ellerslie and also maintained an advisory service to individual settlers.

Citrus Orchard Renovation and Alternative Land Use.—This problem led to continual calls on field officers for guidance. It has reached major proportions in the Gosford district. There it is estimated that 4,000 acres of citrus trees are no longer economically sound and the owners are faced with orchard reconstruction. A similar position exists in the County of Cumberland where repeated and serious flooding by the Hawkesbury River and its tributaries caused further extensive damage to citrus orchards during the year. In the vicinity of the metropolis the sub-division of larger properties continued, but at a slower rate than in recent years. Orchards on the sub-divided properties almost invariably decline in vigour and productive capacity.

Citrus Production Trends.—The general preference for valencias over navels in post-war planting programmes, shows signs of change. The percentage of navels is increasing. Mandarins are receiving more attention, the most favoured being Emporer and Ellendale in coastal districts and Ellendale inland.

Grapefruit is steadily losing favour in most districts, due partly to the virus disease stem pit and partly to low prices for the bulk of the crop.

Lemon planting is at a low level because of low prices offered by processors and for the main crop. Interruption of sales to processing firms in Victoria, because of fruit fly and citrus scab regulations imposed by that State provided a serious setback.

Co-operative Bud Selection Society.—The Society was again assisted by the necessary inspectional service under the Citrus Parent Tree Registration Scheme, and by locating bud supply sources and bud cutters. The scheme was seriously hindered when successive floods destroyed a number of registered plantings.

Again the Society's trees at the Gosford Citrus Experiment Station failed to produce any appreciable quantity of buds, due to dry spring weather. Following the dry spring, wet weather interfered with nurserymen's budding programmes and large numbers of stocks remained unbudded.

CITRUS RESEARCH.

Fruit Fly Sterilisation in Oranges, by Fumigation, by Low Temperature Storage.—This investigation was initiated, under the direction of the Technical Committee on Fruit Fly Sterilisation. Low temperature storage and fumigation are the two main lines of investigation.

The Gosford Citrus Wastage Research Laboratory co-operated in the fumigation work, using ethylene di-bromide. Fruit from Gosford, M.I.A., and Murray River areas were used. Useful progress was made in determining the ability of the fruit from the different districts to withstand specific concentrations of the gas. Coastal fruit proved susceptible to rind injury at 1 lb. E.D.B. per 1,000 cu. ft. initial concentration.

While awaiting the special equipment for gas treatment, investigations concentrated on low temperature storage. The effectiveness of storage at 31°F. $\pm$ 1° for 14 days was shown to the satisfaction of the New Zealand authorities. This was a marked advance on the previous requirement of 31° $\pm$ 1° for 21 days. At the same time, because cool storage involved delays and expense this treatment method was not popular with the industry.

Citrus Propagation.—Propagations for experimental and investigational projects were carried out at Narara Sub-station; 4,095 rootstocks were planted in nursery rows and 2,555 were budded from selected parent trees. Budding operations were carried out successfully under incessant wet weather. Seed beds were planted for rootstocks and some 28,000 seedlings will be available for nursery rows in the spring.

Recurrent flooding of Narara Creek inundated portions of the nursery, and many young trees propagated in the previous year were lost.

Varieties Imported for Citrus Improvement.—Nucellar lemon varieties from the U.S.A., released last year from quarantine to open-land planting, were withdrawn to quarantine at the request of the Chief Biologist.

Trifoliata seed from the Argentine arrived dry and failed to germinate.

Citrus Improvement Committee's Activities.—Experimental plantings continue to confirm the Committee's recommendations, made years ago, that special care is necessary when selecting budwood, to avoid carrying virus infection into the new trees.

Evidence is accumulating that at least one seedling lemon selection is now available for satisfactory use on trifoliata rootstock.

Propagations were continued at Narara Sub-station in pursuance of the Committee's examination of all the known and suspected growth-affecting viruses of citrus trees.

Tropical Fruits.

Seasonal conditions favoured all tropical fruits. Rainfall approximated 50 per cent. above normal throughout the far north coast and the season influenced banana production in respect of quantity and peak production period. Record production affected prices, and figures from Duranbah Plot showed that even with 404 cases of high quality fruit per acre it was only just possible to avoid a debit balance.

Banana Growers' Federation.—The Department continued to enjoy the complete co-operation of the Banana Growers' Federation, which has contributed generously to regulatory, demonstrational, and research work.

Regulatory Services in the Banana Industry.—Banana bunchy top control has been satisfactorily maintained and the disease is confined to a few persistent localities. The limits of control by present methods seem to have been closely approached. The possibility of further control has been given impetus by encouraging results from new insecticides. These offer some prospect of eliminating the virus' vector.

Banana Diseases Control and Development Co-operative Ltd. operated effectively. The levy was reduced by 1d. per case in the northern and 3d. per case in the southern areas.

Inspectional work under the Plant Diseases Act was well maintained in all districts. Responsibilities arising from the Diseases Control Scheme financed by the Banana Growers' Federation were well handled. This work was affected by the February-March flood rains but bunchy top incidence is so low that no major outbreak occurred.

Nine breaches of the quarantine regulations were detected and convictions were recorded in each case. Fines aggregating £104 were imposed. There was no prosecution in respect of grading regulations. Inspections at loading points during the summer periods were effective.

BANANA EXTENSION WORK.

Supplementary Watering of Bananas.—This continued to expand even though record rainfall occurred, indicating that growers now regard it as the best insurance for production and quality. An additional 84 acres was laid down, bringing to 1,154 acres the area of bananas now under supplementary watering.

Trends in Banana Acreages.—The total acreage of bananas is likely to be reduced considerably but effective bearing acreage will show a rise, so production is likely to approximate the high levels of 1955-56. Some ninety-seven growers left the banana industry for economic reasons, and more will do so unless prices firm appreciably during the winter.

Duranbah Plot.—Duranbah Plot retains its popularity with growers as a place to see the latest in recommended methods and a wide range of tropical fruit. The 10th Annual Field Day was held in April, 1956. Highlight of the day was the official release of the district entomologist's results with new insecticides for control of banana beetle borer and rust thrips.

TROPICAL FRUIT RESEARCH.

Investigations are maintained at Duranbah Plot pending establishment of the Tropical Fruits Research Station at Alstonville.

Plastic Bunch Cover, for Bananas.—Further temperature observations were recorded for a wide range of colours and types of covers; and durability studies were continued.

Banana Planting Distance Trial.—The 10 ft. x 9 ft. and 9 ft. x 9 ft. plantings again showed highest yields.

Banana Irrigation vs. No Irrigation plus Fertiliser.—Maturity levelled out on the second cut but production was higher on the irrigated plot.

Banana-Waxing Trials.—These were commenced to ascertain the practicability and advantages of waxing the fruit for marketing. Progress results indicate that it is practicable to wax the bunches or hands prior to packing, and that the treatment has a delaying effect on the ripening process. It is worth further investigation as a potential method of holding fruit in periods of emergency.

Banana Plant Development Studies.—These studies were maintained to ascertain the average number of leaves developed up to bunching, the effects of seasonal conditions on this function, and the variation in leaf population of follower plants selected at different periods of the year.

Banana Variety Collection.—This has been increased in anticipation of establishing a useful arboretum at Alstonville when the Tropical Fruits Research Station is functioning there.

Miscellaneous Tropical Fruits.

Miscellaneous Tropical Fruits, Investigations.—Investigations of avocado, mango, papaw, passionfruit and Macadamia nuts have been maintained.

Litchi Nut.—Four varieties were introduced from Hawaii, and three have been successfully established.

Pineapples.—A small increase, 17 acres, was recorded, bringing the total to 476 acres. Because of high cost of establishment, future expansion will hinge on the ability of the Ballina Cannery to offer reasonable term contracts with attractive prices.

Passionfruit.—Acreage dropped slightly, to 104 acres. A severe cold snap in the 1955 winter handicapped fruit setting, and the subsequent summer favoured diseases. The season demonstrated that plantings in which pest and disease control are inadequate are doomed to fail.

Macadamia Nut.—Commercial handling and processing investigations were continued in co-operation with Messrs. Angus Bros. of Murwillumbah. A direct outcome, so far, is the accurate costing of processing, from cracking to cooking. This has enabled the determination of a fair average price to grower and processor, and fair quantities are now being processed at Murwillumbah.

While Queensland investigators have placed *M. tetraphylla* in the discard and given full preference to *M. ternifolia*, both species will be fully investigated in New South Wales. Hawaiian work has shown that *M. tetraphylla* has a potential as a high quality nut. In propagation studies at Duranbah Plot two varieties from Hawaii have been established.

Avocado.—This fruit is gaining popularity with Australian consumers. Only 31 acres are recorded but growers interest is increasing. Several small projects in the Tweed district have been helped with seed, scion wood, and instruction in the budding and grafting methods.

Root-rot is taking a fairly heavy toll of avocado trees, at all stages from the seed-bed to mature plantings. This necessitates work on root stocks for affinity and resistance to root-rot *Phytophthora cinnamomi*.

Mango.—To prepare the way for possible future expansion, reputable varieties have been established at Duranbah Plot. Some forty selected strains are under observation and some appear to have high potential.

Pome Fruits.

Early in the season the State apple crop was estimated at a little below the record crop of 1954 which was 2,400,000 bushels, but the season was abnormally wet, losses through hail damage and disease were particularly severe, and possibly only 80 per cent. of the total will be marketed. Much of the crop would be only "Good" and "Domestic" grades.

Commonwealth permission was given for the shipment earlier than usual of 10,000 cases of Granny Smith apples from the M.I.A. to England. The initial shipment was scheduled to leave Sydney on 23rd February, but a shipping strike caused delay until 8th March, 1956. High prices were realised, 60s. per case. Subsequent shipments from New South Wales were small because of hail damage, disease damage, and excessive spray residue, and were destined mostly for the "near East".

Following the previous season's record the pear crop was reduced to an estimated 35,000 bushels. Hail and fungus troubles spoil the crop.

POME FRUIT EXTENSION SERVICE; AND GENERAL.

Pests and Diseases.—Reflecting the season, black spot was a serious menace throughout the season. The application of twelve to fifteen sprays was necessary in districts such as Orange and Batlow. Other pests and diseases were kept in check.

In all highland areas late spot development during May, 1956, caused a problem in cool storage, and bitter pit as a result of the large size associated with the thinning effects of some of the new organic fungicides was noted in several areas.

Spray Equipment.—The value of modern spray equipment was well demonstrated, when full advantage was taken of the short periods of fine weather. The majority of larger orchards in most districts are now equipped with either boom, air-blast, or concentrate units.

Cool Storage.—Fruit cool storage capacity throughout the State again increased, and most of the extra capacity was at Orange and Bathurst. At Orange, six additional grower stores were completed, making a total of thirty-one such cool stores, with a capacity of 140,000 cases, in that district. The Orange Producers Rural Co-operative Society Limited has made additions which, when completed, will bring the total capacity of all stores in that area to 385,000 cases. Orange has the largest cool storage capacity outside the metropolitan area. In the Bathurst area, also, there are now several grower-owned stores and, with other space available, amount to 32,000 bushels capacity; another 5,000 case store is in course of construction.

Pome Fruit Planting Trends.—Extension of plantings was restricted to a few of the better districts, notably Orange and the early coastal areas. Granny Smith plantings in the highland districts decreased in favour of coloured varieties, and at Orange more of Red Jonathan than any other variety was planted last season. At Batlow the new plantings of note were Williams pear for canning purposes.

Early coastal districts produced an estimated 150,000 to 200,000 bushels from 64,818 bearing trees. As there are 33,551 non-bearing trees in the area, mostly in the two main districts, Oakdale and Bilpin, the potential increase in production is considerable, particularly so in view of the better stocks and better soil management which have been advocated by extension service.

The overall position for apples and pears is that the proportion of young non-bearing to bearing trees is very satisfactory and more than sufficient for the replacement of aged trees.

Apple Pre-packaging.—A notable development was the commencement of pre-packaging of apples, in polythene bags containing approximately 3 lb.

Fibreboard Cartons.—Paper manufacturing interests have promoted the use of fibreboard cartons in place of wooden cases.

POME FRUIT RESEARCH.

Apple Rootstock Trials.—Results of trials distributed throughout the main districts confirm in general the Bathurst Experiment Farm results. They showed that for the first two decades of the trees' life, northern spy is the most productive stock for Granny Smith and Delicious. Granny Smith trees composed of seedling roots with northern spy intermediate stem-piece have, however, yielded 41 per cent. more fruit than on northern spy. Pure-rooted Jonathan yielded 28 per cent., and on East Malling 13 yielded 13 per cent. more than on spy. For Democrat other stocks are superior to spy, with Granny Smith seedling, 25 per cent. more fruit, the best.

Later results are awaited with great interest, as the seedling-rooted trees are larger and beginning to show the benefits of their larger bearing surface. Propagations with new and introduced rootstocks are being made for future trials.

Pear Rootstock Trials.—The Departmental clonal rootstock, *Pyrus calleryana* D6, and a Victorian clone, PC4, yielded 50 per cent. more than other clones, and eight times better than some *Pyrus communis* seedling rootstocks. *Pyrus communis* was formerly the commonly-used stock, but now nurserymen are interested in calleryana. The Division of Horticulture has supplied nurserymen with trees in order that they may have their own source of this variety.

Twist of Gravenstein.—Results of this investigation, giving conclusive methods of preventing twist, were published during the year. Recommended clonal propagations are being made at New England Experiment Farm nursery.

Chemical Thinning.—Recommendations on the use of naphthalene acetic acid in anticipation of a heavy crop were published and were adopted fairly widely by growers. Experiments comparing naphthalene acetamide and testing adaptability to concentrate spraying, were continued with satisfactory results.

Apple Breeding, and Black Spot Resistance.—Fifty-seven of the top-worked selections at Bathurst Experiment Farm fruited, and the high incidence of black spot enabled many to be discarded from this viewpoint. The selection BB 122/2 continued to show promise and was almost entirely free of attack by black spot; BB 48/27, previously free, was seriously affected by black spot.

In the seedling testing frames, almost all varieties proved resistant under a heavy black spot spore load.

Urea Sprays.—Urea sprays as a means of supplying trees with additional nitrogen via the leaf gave good results on some staggier trees, but negligible results where extra nitrogen was not required.

Pome Fruit Storage Research.—Investigations of gas storage of apples and pears, wastage of Winter Cole pears, and other cool storage problems, yielded information of value to cold store operators.

Stone Fruits, Berry Fruits, Dried Vine Fruits, Nuts, and Miscellaneous Fruits.

The 1955-56 season was one of the worst possible for stone fruits. The wet winter resulted in death or marked decline in health of many trees in many districts.

Record crops of apricots and peaches in the M.I.A. were reduced by losses from brown rot and other causes; but even so 7,160 tons of apricots and 14,030 tons of peaches were obtained.

Cherry crops were medium at Young and light at Orange. Some white cherries were placed on the fresh fruit market, and thus reduced the quantities available for brining. Only 96 tons were brined in 1955-56, compared with 240 tons in 1954-55 and 480 tons in 1953-54.

The set of well-sized prunes was reasonable, but at Young much of the fruit was low in total solids and the dry-out ratio was poor. Prune marketing prospects improved, with increased United Kingdom demand.

Early stone fruits in the County of Cumberland were harvested successfully, but rain and severe hail damaged the mid-season and later fruits. Early apricots, plums and peaches were marketed at satisfactory prices.

At Coomealla, Curlwaa, and Pomona, on the Lower Murray, severe frosts reduced the sultana crop by one-third. Wet weather at harvest depressed the potential yield of unfrosted vines; wastage on the racks amounted to 30-40 per cent. of total yield. There were heavy infestations of vinegar flies, particularly in mid-Murray areas. Some success in reducing this pest was obtained with a fogging machine using B.H.C. and D.D.T.

EXTENSION WORK.

Heavy demands were made on extension services because of the abnormally wet season. There were increased requests for assistance with contour layout and orchard drainage problems.

Organised group meetings and field days in districts were designed, in most cases, to deal specifically with important, district problems.

In the M.I.A. special attention was given to the techniques of concentrate spraying and to brown rot control.

In the Young district, campaigns emphasised the value of nitrogenous fertilisers, the control of rust, and proper soil management, in prune orchards. The district fruit officer also made available contributions towards solving prune dehydration difficulties in various localities near Young.

In Murray River districts there was constant demand for viticultural advice and advice in connection with new plantings of stone fruits. Where new settlements are being established special attention was necessary to land use, farm design, spray-irrigation and drainage designs, and land-grading techniques. In mid-Murray districts where there is some change from vine to stone fruit growing, demonstration plots of apricots, plums, prunes and peaches were established.

In the Batlow district the establishment of some freestone peach orchards, to supply the local cannery, necessitated special extension work on planting, pruning, spraying, and general cultural requirements of these trees.

Stone Fruit Planting Trends.—Increased plantings of canning peaches occurred in the M.I.A., continuing the trend of recent years. They are mainly of golden queen, pullars, and some newer varieties, including gaume and wight. Despite an over-all reduction of approximately 200 acres of bearing trees, M.I.A. production of canning peaches has increased by about 5,000 tons over the 1946-47 crop.

There is a decided trend towards the planting of more dessert peaches at Armidale, Inverell and Tenterfield.

Apricot plantings in the M.I.A. over the past two years have been substantial. Bearing acreage as well as total acreage is tending upward, and thus apricot production has increased. In early apricot districts the variety caselin was most favoured in recent plantings.

Cherry plantings at Young have been such that now there are more non-bearing than bearing trees, and production may increase considerably over the next few years. Small plantings of cherries at Orange have been mainly the late varieties St. Margaret and Rons.

In the 'Hills district, near Sydney, stone fruits are largely replacing citrus. Production of stone fruits is sharply declining in the Liverpool and Campbelltown districts, but expanding in the Cobbitty, Camden, and Lakesland areas.

Development of fruitgrowing properties at Coomealla for soldier settlement is now completed, but a further small scheme at Buronga is now being considered by Commonwealth and State Authorities.

Supplies of stone fruit nursery stock were far below requirements last year and, because of heavy losses of stocks due to wet autumn conditions, and the high incidence of the root disease *Phytophthora cinnamomi* in many nurseries, will fall short again this year.

RESEARCH WORK.

Stone Fruit Variety Trials.—New, locally raised and introduced stone fruit varieties are continuously under trial on Experiment Stations and private orchards. This year, first fruits were obtained of two early dessert peaches introduced from Canada and of one from the U.S.A. These peaches show considerable promise as early maturing types for fresh fruit markets. Data were again collected concerning canning peach varieties under trial at Yanco Experiment Farm and again showed Golden Queen to be by far the most impressive variety. Of the earlier maturing varieties, Ellis was most promising. Wight and Windra appeared to be promising late-maturing types.

Peach Breeding.—Crossbred seedlings of freestone peaches have been planted out at Bathurst Experiment Farm with the object of producing new, high quality dessert peaches of the J. H. Hale type. This year the first group, comprising sixty seedling trees, produced the first fruits; and four have been selected and top-worked on to mature trees. Similar work with clingstone canning peaches is being conducted at Yanco Experiment Farm.

Pruning and Thinning Canning Peaches.—No pruning and very light pruning treatments have failed to maintain vigour in Golden Queen peach trees; the crop was lighter and the fruit much smaller than from trees receiving orthodox and long lateral pruning.

In the M.I.A. trial, on Golden Queen trees planted in 1946, no obvious distinction remained this season between those trees pruned heavily in the formative years and those pruned lightly. Each treatment carried approximately the same crop, and average trunk diameters were almost identical. This evidence shows clearly that strength and vigour can be maintained while marketable crops are carried at an earlier age.

Urea Sprays on Peaches.—The effect of applying nitrogen to peach trees by means of urea sprays was investigated at Yanco Experiment Farm. Trunk diameter measurements indicated that there were no differences in average increments for the year where three urea sprays were compared with a standard soil dressing of sulphate of ammonia.

Plum Stock Trials.—Plum stock trials planted in 1942-43 and 1946-47 are located in various parts of the Young district. Tree growth is consistently more vigorous on buck plum stock. This may prove to be a very important factor in prune growing at Young, as most prune trees planted in recent years on other stocks have made unsatisfactory growth.

Variety and strain trials were planted in conjunction with stock trials in 1946-47. Records and observations suggest that the varieties and strains tested will be inferior to the standard d'Agen.

Prune Fertiliser Trials.—Fertiliser trials laid down in 1953 with funds provided by the Young District Producers' Co-operative Society were continued. Nitrogen applications have increased crops but where continued applications of sulphate of ammonia have been made the trees apparently become more susceptible to rust, and the fruit lacks colour and matures later. Blood and bone and a complete fertiliser increased cropping and improved tree health without any apparent adverse effects.

Prune Rust Control.—Various aspects of prune rust control were investigated in co-operation with the Biological Branch. Zineb proved outstanding for control. Both bordeaux and thiram with white spraying oil gave satisfactory control. Sulphur sprays were generally unsatisfactory. Larger fruits and higher yields were obtained from thiram sprayed trees as compared with those where either bordeaux or lime sulphur was used.

Prune Thinning.—Preliminary work was conducted in the chemical thinning of prunes, and results indicated the materials and strengths likely to be useful for this work.

Internal Breakdown of Apricots.—The major trial at Yanco Experiment Farm was continued, but incidence of breakdown was relatively low. Of the sulphate of ammonia treatments, 8 lb. per tree resulted in the highest incidence of breakdown. Of the wilting treatments through differential irrigation, early wilted trees had the most breakdown, followed by non-wilted trees, with late-wilting showing least.

Cherry Varieties and Stocks.—Seedlings of Mazzard, Mazzard F12/1, Mahaleb and Rons planted at Orange were successfully grafted during the 1954 and 1955 seasons to main commercial varieties and an imported English variety, Merton Heart. All trees have made excellent growth, and Merton Heart trees are particularly vigorous.

Almond Pollination.—Investigations at Wagga Agricultural College and Experiment Station to find a good commercial almond which is cross-compatible with the Hatches variety have shown that a seedling almond which originated at Wagga has satisfactory qualities and is a suitable pollinator for Hatches, but reverse pollination is not satisfactory.

Pecan Nuts.—To test varietal cropping, a new planting of pecan varieties was made at Narara Sub-station on alluvial soil. They are receiving fertiliser and cover crop treatment. Investigations concerning pollination of pecans, stigma receptivity, and varietal yields, gave useful records.

Strawberries.—Nine types selected at Narara are under test and further selections will be made from the 350 seedlings, from ten sources, planted out during the year. Hormone and other herbicides for the control of weeds in strawberry beds are under investigation in co-operation with the Division of Plant Industry.

Freezing Investigations.

Peaches.—Experiments on the use of ascorbic acid for preventing discolouration in frozen peaches were completed. The results confirmed those of the previous season in which it was found that the level of ascorbic acid should be at least 150 mg./lb. There appeared no further improvement in quality when the amount of ascorbic acid was increased beyond the 150 mg./lb. level. There were some differences between varieties in the effect of any particular amount of ascorbic acid, but the maximum protective effect was generally at a level of 150 mg./lb.

Berry Fruits.—Studies on the freezing of berry fruits were undertaken on a co-operative basis with the C.S.I.R.O. Tasmanian Regional Laboratory and the Tasmanian Department of Agriculture. Most of the past year's work was related to the storage of the products at temperatures of 0°F. and 14°F. Samples of frozen raspberries at 14°F. showed a significantly greater deterioration in wholeness and shape when compared with those stored at 0°F. Significant changes in quality with increasing time of storage were observed at both temperatures, for both raspberries and strawberries.

Plastic Materials for Fruit Tree Propagation.

Trials have been conducted to compare the standard material raffia with two types of plastic strip for tying buds. Peach, apricot and cherry stocks were used, the plastics being vynex vinyl film 620 and alkathene film. Plastic strips gave very good results; particularly with apricots, where the percentage of successful propagations was more than double that obtained with raffia. Plastics have great advantages in handling compared with raffia, and a higher percentage of successful propagations makes it competitive in cost.

Wine and Table Grapes.

Wine Grapes.—The past season was one of the worst on record for both wine and table grape production in New South Wales. Rainfall and humidity were excessive throughout the growing and ripening periods in all districts. Downy mildew incidence was high, spraying and cultural operations were hampered, harvesting was delayed and considerable areas were not harvested.

The quantity of grapes received by the wineries in the M.I.A. was 12,770 tons compared with 11,600 tons in 1955, each only about half the production of a normal year. A large part of this year's production will be fit only for distillation.

The succession of poor seasons in the M.I.A. has placed many wine-grape growers in an unenviable position, though it affords larger wineries an opportunity to reduce their surplus stocks. The small wineries are seriously affected, most having limited storage and depending on a rapid turn-over of wine. They will have difficulty in maintaining supplies until next vintage wines are ready for sale.

Salt damage to vines in the M.I.A. has become more apparent in recent years. The high rainfall in 1955-56 may accentuate the problem. The wine grape plantings in the M.I.A. has virtually ceased, and some areas have been or will be removed. Growers fear their economic position and prospects of disposing of their crops.

The Hunter River district vintage figures will be slightly lower than in 1955 but the wine quality is reported as good; better than in the previous year.

Actually, the economic position of the wine industry improved slightly during the year. Home consumption and export figures showed increases, partly reflecting increased advertising efforts by the Australian Wine Board and, possibly, the indirect effect of increased excise on beer and spirits.

Table Grapes.—Downy mildew and botrytis rot seriously damaged table grapes in Cumberland and Orange districts. Reports of insufficient colouring and ripening of fruit were widespread. The cause, except unusual seasonal conditions, remains unexplained.

Prices were considerably higher than in 1955, a reflection of depressed yields.

VINE INDUSTRY EXTENSION SERVICE.

The Superintendent of the Griffith Viticultural Nursery continued to give valuable advice on pruning and disease control, etc., to growers in the M.I.A. Extension service in other districts in the viticultural field was hindered by staff shortages, now relieved.

VINE RESEARCH.

Experimental Wine Grape Planting, Molong.—The vines continued to make excellent growth. The plot bore its first crop. This was processed at Penfold's Minchinbury Cellars, Rooty Hill.

Rootstock and Spacing Trials, Griffith.—Because of salt damage to the vines it has been decided to cease collection of yield records. The trials supplied valuable information in past years.

Fungicidal Spray Trials.—Trial of newer, organic fungicidal sprays for downy mildew and black spot control were carried out by the Biological Branch. The efficiency of the various fungicides appears to be dependent on formulation. The organic fungicides result in far less leaf damage than does bordeaux mixture.

Vine Fertiliser Trials.—Trials have shown some response to potash but not regularly. Analyses of grape leaf samples indicate significantly lower contents of nitrogen, potash and phosphate compared with leaves from overseas and South Australia.

Phylloxera Resistant Rootlings.—The demand for *Phylloxera* resistant rootlings remained reasonably constant. Sales in 1955 amounted to 38,565 rootlings while orders to hand for

the current season amount to 40,370. The price of the rootlings has been reviewed and will be increased 50 per cent. as from the 1957 season, bringing the price to £22 10s. per thousand.

Salt has seriously affected the lower sections of the Griffith Viticultural Nursery, and the *Phylloxera*-resistant rootling propagation area has been transferred to higher ground. Tests

by the Water Conservation and Irrigation Commission have indicated that the nursery cannot be adequately drained at the 6 ft. level.

Because propagation of sufficient rootlings at Griffith Viticultural Nursery has become so difficult, and pending the formulation of a new policy regarding the production of these rootlings, about 680 mother vines have been planted at Yanco Experiment Farm to supply cuttings.



Migrants' Baggage vs. Animal Quarantine.

Policing the waterfront and airport the animal quarantine service made heavy seizures of *salami sausage* and home made *cheese* in migrants' baggage. This is the most likely means of introducing Foot and Mouth Disease.

Prohibited items were frequently concealed deliberately in tins of olive oil.

(Photo from Animal Industry Division).

DIVISION OF ANIMAL INDUSTRY.

Veterinary Staff Shortage.

The veterinary staff position has possibly never been more serious. There were one retirement and three resignations. One of the latter was a veterinary officer under trainee bond; the other two had served out their bonds. There was one appointment, a junior veterinary officer to Glenfield. Among the inspectors of stock were one resignation and two age retirements, whilst one new appointment occurred.

Overall, it is not possible to ensure a satisfactory veterinary service. In a critical emergency, say an outbreak of foot and mouth disease or even swine fever, there would be insufficient qualified personnel in both services to handle the needs with certainty and speed.

Attention to tuberculosis, trichomoniasis, vibriosis, and footrot, and research into bovine infertility and other disease problems, have been hindered by staff shortage.

Incidence of Diseases.

Seasonal conditions had a profound effect. Inland, monthly rainfall was below average only during one month and in the second six months the rainfall was greater than the average annual. In consequence, feed growth quickly became rank and unsuitable for sheep. There were repeated floodings. Inland country was waterlogged and large areas remained submerged for months. It was not surprising that sheep were seriously affected.

Internal parasites, notably *Haemonchus contortus*, *Oesophagostomum columbianum*, and *Trichostrongylus* spp., built up to epidemic levels even in many tracts of so called "sound country" where previously they have caused no trouble. Outbreaks of haemonchosis have now been recorded as far west as Cobar and Deniliquin. Oesophagostomiasis has spread into the north-west, and to the Riverina and other southern areas.

Footrot has become widespread through the central and southern tablelands and slopes, and the Riverina, and has now occurred in a few northern places. Foot abscess has increased to unprecedented proportions and is vying with footrot, practically State-wide. Scald is very prevalent too; so severe that it has spread down the inside wall and sole as well, adding to stockowners' diagnostic uncertainties.

In cattle, there was a severe outbreak of pleuro-pneumonia in the southern Riverina, involving seventy properties and 10,000 head. On the north coast, an extensive outbreak of trichomoniasis involved nineteen properties. For the first time since 1937, cattle in New South Wales were affected by an epizootic of ephemeral fever.

The following comments are offered in respect of individual conditions.

Pleuro-pneumonia Contagiosa.—The outbreak at Bourke, mentioned in last year's report, has, in the main, been brought under control. The majority of the cattle concerned as in-contacts were bled and the reactors disposed of by slaughter at the Bourke abattoir. The outbreak herd now numbering approximately seventy animals, remains to be bled. Local flooding in the Narran river system interfered with control in the area, but resulted in the effective confinement of stock to their own properties.

There was a second outbreak in the Bourke district. An acute case was found in about 450 cattle being held at the Bourke district abattoir. The only in-contact cattle were 500 in the Bourke Common belonging to three different owners. The abattoir mob had been partially slaughtered out at the close of the year under report, and arrangements to bleed the in-contact cattle were in hand.

An extensive outbreak of pleuro-pneumonia occurred in cattle in the Riverina in April, 1956. About 1,050 head from a property in Hay district were sold by special sale at Deniliquin on 15th March, 1956; some went to Victoria and were

resold at Echuca saleyards the following day; the majority remained in New South Wales, and some passed through Deniliquin saleyards again on 26th March and 23rd April.

Outbreaks of pleuro-pneumonia in the Victorian purchases were reported on 24th April and, within the next few days, outbreaks were found in some mobs purchased by New South Wales owners. A further draft of 1,040 was at that time travelling on foot between the outbreak property in the Hay district and the Deniliquin saleyards. This mob was intercepted and returned to the property.

Approximately seventy properties were placed in quarantine and at the close of the year under report, there were known to have been 204 head of cattle which died or were destroyed on the twenty-one outbreak properties.

On the property in the Hay district responsible for the outbreak, control has been impossible owing to continued flooding, and there is no way in which the deaths from pleuro-pneumonia can be ascertained. Floodings there have rendered control extremely difficult, if not impossible; and overall the wet conditions have hindered effective control because the herds cannot be examined frequently.

The outbreak imposed a great strain on the district veterinary officer and inspectors of stock in the area. The main districts concerned were Deniliquin and Jerilderie, but Hay, Moulamein, and Corowa also included properties placed in quarantine.

An attempt was made to have as many cattle as possible slaughtered under supervision, but the difficulty in transporting them to abattoirs in New South Wales from this more or less isolated area of the State could not be surmounted. Consequently, a formidable task awaits the staff in that area, to fulfil the policy of bleeding out affected and in-contact herds.

Ephemeral Fever.—For the first time since 1937, New South Wales cattle were infected with an epizootic of ephemeral fever. The disease first appeared at Boggabilla in December, 1955. In January, 1956, a considerable number of herds on the north coast were infected. The disease swept down the coastal region and, more slowly, tracts of country further west, until it reached a southern-most limit about level with Sydney.

The disease was more severe than in 1936-37, and there were more cases of cattle infected on more than one occasion. Deaths were at a slightly higher rate than in 1936-37. Loss of milk production in the north coastal region was marked. The disease faded out in June, 1956, when the last cases were reported west of the Great Dividing Range.

None of the antibiotic preparations or other drugs appeared as a specific against the disease.

Internal Parasites of Sheep.—The season led to considerable extension of worm infestation, to areas not previously considered susceptible to clinical infestations. The continual summer rainfall favoured the survival of eggs and infective larvae of *Haemonchus contortus* and the nodule worm *Oesophagostomum columbianum*. Many stock owners were caught off guard, and a rapid build-up of the worms followed. Mortality was not uncommon. The worms' effects were so severe that a single drench with phenothiazine did not appear to give control, but where drenching was continued and rotational grazing was practised the trouble was brought under control.

The extension of oesophagostomiasis has been noticeable on the southern tablelands and slopes which previously were little troubled by it.

Manufacturers who drew on sheep casings were perturbed at the extent of infection, even in young sheep. It rendered the bowel wall unsuitable for the manufacture of casings.

Clinical infestations, combined with carry-over infections of *Haemonchus* caused severe damage early in the winter and there was then a severe build-up in Trichostrongyles.

The parasites' effects were magnified because nutritional value declined as pastures became rank. Furthermore, selective grazing habits tended to promote small areas with high sheep population, contributing to excessive contamination of those areas.

Overall, the year was probably the worst in history in respect of those parasites.

Foot Conditions in Sheep.—The conditions also played a profound part in the spread and occurrence of sheep foot troubles, softening the hooves and allowing footrot and foot abscess organisms, always present, to gain entry.

The opportunity for footrot to spread was unlimited and it has now become prevalent on the central and southern tablelands and slopes and in the Riverina. It has been estimated that about 80 per cent. of southern slopes and Riverina flocks are infected. Fortunately, cases in the northern areas have been rare, and extensive adoption of advice by stockowners there has greatly limited the spread.

Foot abscess has reached, in many flocks, proportions even more serious than footrot. Incidences as high as 60 per cent. of sheep affected have not been uncommon.

Scald has this year extended its normal site of infection from the interdigital space, to the adjacent inside walls of the claws, and sometimes even to the sole, confusing stockowners because differential diagnosis has been so difficult for them. Consequently, control measures recommended by the Department have not been received without scepticism; since there have been numerous reports in the press of successful eradication of "infectious forms of footrot", e.g., by using substances such as petrol. In cases investigated petrol has not been proven any more successful for the control of infectious footrot than formalin or chloromycetin, and those which have been claimed as cures by stockowners were found to be foot conditions other than true, infectious footrot.

It has been amply demonstrated that the advice of veterinary officers and inspectors of stock in the control of all three conditions has been soundly based; and that, even under the conditions, stockowners prepared to put in the necessary work could achieve control of infectious footrot and could to a great extent alleviate the effects of the other conditions.

A complication from foot conditions occurred during the lambing season. Ewes heavy in lamb suffered a check in plane of nutrition, from all directions, viz.: excess rankness of the feed and the presence of foot complaints, which restricted their movement and thus their food intake.

Brisket Abscess.—This was somewhat prevalent because of the excessively wet conditions. It was widespread and, at first, caused appreciable sheep mortalities. The disease is caused by an infection of the brisket area which is in contact either with the ground or with infected feet of sheep for excessively long periods. It was amenable to massive doses of penicillin combined with local treatment of the abscess.

Enterotoxaemia.—It was a bad year for enterotoxaemia. The more recent recommendations, double inoculation of the ewe prior to lambing, to induce a reasonable degree of protection in the lamb, and the giving of booster doses to lambs subsequent to marking, were overlooked in many cases. Consequently some heavy mortalities occurred. Double vaccinations were sometimes necessary to bring the disease under control.

Urinary calculi.—Incidence of urinary calculi was higher than in normal seasonal conditions. Mortalities of approximately 5 per cent. amongst wethers were not uncommon on the south-western slopes and plains. Some calculi examined at the Research Station, Glenfield, were composed of siliceous material and calcium and magnesium salts. It has been postulated that the disease proportions were associated with the higher plane of nutrition on properties with improved pastures, during the early spring when conditions were flush but before growth became excessive.

Trichomoniasis.—At extensive outbreak of trichomoniasis was discovered on the north coast. Soon after the outbreak was found, an extensive flood led to mixing of infected and apparently clean herds, and almost all of the herds concerned in that area have been brought into "control".

Control of the disease was hampered by the fact that an artificial insemination service was not available. Co-operation of the stockowners has not been 100 per cent., and control will proceed for longer than usual. In all, twenty-two outbreaks were found, involving five districts and 1,341 head of cattle.

Vibriosis.—This was recorded on three occasions. Recent information has shown that eradication measures are extremely difficult. Virgin heifers can be found infected; normal pregnancy can occur in an affected animal, thus making it impossible to determine from that alone whether an animal is infected. Lack of an overall artificial insemination service is also felt in dealing with this disease. Diagnosis is extremely difficult too.

Congenital Cerebral Deficiency.—Reports of foetal dystokias were received from veterinarians practising in the outer metropolitan area, the near south coast and, some adjacent tableland areas. As the season progressed, the dystokias gave way to a condition where the calves appeared to be partially or completely blind and stupid. Investigations revealed that the dystokias were caused by interference with the movement of joints by fixation of muscles, thus making difficult calvings. Towards the end of the season there were no dystokias but

affected calves were born with cerebral hemispheres completely or partially absent. In a transition period, midway through the calving season, cases of the muscular lesions and the cerebral lesions appeared, in the same calf. It was not possible to isolate the cause. The course of the disease, if present this year, is awaited with interest.

Tuberculosis.—(a) The testing of cattle under the *Milk Board Scheme* is summarised in the following table:—

	No. Tested.	No. of Reactors.	% Infection.
Metropolitan	11,678	161	1.38
Blue Mountains	105	Nil	Nil
Wollongong	457	2	0.43
Hunter district	1,794	1	0.01
Erina district	498	1	0.02
Newcastle district	1,123	5	0.44
Totals	15,655	170	1.09

There was one breakdown, when tubercle bacilli were found in the milk of a metropolitan herd. This was quickly brought under control by Departmental testing.

(b) *Tubercle-free Herd Schemes.*—Thirty-three stud herds, involving 3,531 head of cattle were tested and seven reactors were detected; fifty-three non-stud herds were tested, involving 3,374 cattle, and six reactors were detected.

(c) *Tuberculosis Protected Areas.*—Tests were carried out in seventeen areas, involving 5,242 cattle, and four reactors were detected.

(d) *Testing under the Local Government Scheme.*—Testing was undertaken in seventeen areas, involving 9,445 cattle, and thirty-two reactors were detected.

(e) *Miscellaneous Testing.*—In tests other than the foregoing, 68,913 cattle were tested and 3,220 reactors were detected; an incidence of 4.67 per cent. as compared with 6.51 per cent. in 1954-55 and 4.56 per cent. in 1953-54.

Brucellosis in Cattle.—Under the Departmental Brucellosis-free herd scheme, thirteen herds were tested in the stud section, involving 980 cattle, and four reactors were discovered. In the non-stud section, nine herds were tested, involving 536 cattle, for the detection of one reactor.

Anthrax.—Twenty-one outbreaks of anthrax were recorded, the majority in sheep. The approximate numbers of stock involved were 28,896 sheep, with 604 deaths; 66 cattle, with 5 deaths; 154 pigs, with 7 deaths; and 3 horses.

Leptospirosis.—Leptospirosis in cattle was increasingly reported. This disease is not quarantinable. Consequently statistics are not available, but it is known that the outbreaks investigated by veterinary officers and inspectors of stock were more numerous than for some years past. In specimens submitted, *L. pomona* was the pathogen. An officer in the Tick Quarantine Areas found several beef herds in the district affected and that the disease caused mortality in calves and affected growth rate in cases where it was less severe. The mortalities were revealed when the veterinary officer investigated losses originally suggested as concerned with the dipping programme. In other areas of the State circumstances may be similar.

Bovine Malignant Catarrh.—This was reported last year under "Malignant Catarrhal Fever". It has still not been possible to confirm the disease as present in New South Wales, because it has not yet been transmitted from specimens from outbreaks. However, histological examinations have indicated that it almost certainly is present. Nineteen supposed outbreaks, in six districts, were investigated. The districts, with two exceptions, are in southern New South Wales.

Neo-natal Losses in Lambs.—Deaths of lambs at birth, or very soon after, were fairly widespread; due in part to exposure to incessant rain at the lambing period. In central and southern areas, in some mortalities the deaths were attributed to the ingestion of oestrogenic substances in subterranean clover. Prolapse of the uterus and lactation in wethers were also associated with this condition.

Brucellosis in Swine.—Under the Brucellosis-Free Herd Scheme, fourteen herds were tested, involving 237 pigs, without detecting a reactor. In the non-stud section, thirteen herds were tested, involving 582 pigs; for one reactor.

Tuberculosis in Poultry.—Seven new outbreaks were discovered, one in a follow-up inspection after the detection of tuberculosis in some pigs forwarded from the property. It

seemed probable that avian tuberculosis was responsible for the lesions in the pigs, although the organism in the pigs was not typed.

The policy adopted by the Department has resulted in release of a further nine properties from which the disease has been eradicated.

Pullorum Tested Flock Scheme.—The scheme for accreditation of pullorum tested flocks was revised. As a result, 55 flocks were included. All the tests, except of Departmental flocks, are undertaken by private practitioners. There were 10 flocks in Class 1 (Pullorum free), involving 28,243 birds. In class 2 (Pullorum clean), percentage of reactors less than 2 per cent., 23 flocks, 85,714 birds. In Class 3 (Pullorum tested), i.e., breeding stock only tested, or more than 2 per cent. of reactors, 22 flocks, 19,354 birds.

External Parasites of Sheep.—The new policy, instituted in 1954-55, of inspection at Flemington saleyards, resulted in considerably improved health of sheep offered for sale there this year. The number inspected was 1,979,229, approximately the same as for the nine months of 1954-55. The number of pens inspected was 7,186, approximately 4,000 less, due to changeover and replacement of staff. Only 29 pens, involving 4,558 sheep, were found infested and the degree of infestation was much lighter than in the previous year; a justification of the policy. Elsewhere in the State, 300 properties, involving 462,274 sheep, were found to be infested.

EXTENSION WORK—VETERINARY.

The prevalence of certain diseases, as reported, and the increasing tempo of extension generally, has placed a severe strain on the staff. Even so, the officers have co-operated fully, in sessions at field days conducted by various Departmental and semi-Departmental organisations, and also in using the press and the radio.

One of the most successful field days, judged by attendances, was that organised by the district veterinary officer, Orange, to deal with the subject of footrot and allied foot conditions of sheep. Approximately 1,500 people attended.

Animal Quarantine Service.

The activities associated with legal importations are tabulated:—

	1954-55.	1955-56.
Permits to land animal produce (overseas)	2,231	2,142
Permits to land livestock (overseas)	456	444
Permits to land animal produce (interstate)	782	338
Permits to land livestock (interstate)	13	26
Animals put into quarantine ...	194	163
Animals died in quarantine	3	—
Animals exported overseas (excluding poultry)	2,340	2,674
Animals exported by sea (interstate)	343	9,452
Animals exported overseas, including day-old chickens ...	53,927	51,112
Number of tanneries registered .	29	20
Number of feather mills registered	3	3
Number of A Class Zoological Gardens licensed	1	1
Number of B Class Zoological gardens licensed	6	5
Number of B Class circuses licensed	15	15
Number of A Class theatres licensed	1	1
Number of B Class theatres licensed	1	1
Approved place for treatment of pig hair	1	1

Migrants' Baggage.—The inspection of baggage of migrants, particularly from Italy, was of outstanding importance in policing the waterfront and airport to prevent illegal importations.

Some 27 vessels arrived, January to May, bringing European migrants. Their individual baggage was searched. Seizures of salami sausage and home-made cheese were heavy. In many cases the prohibited items were deliberately concealed in tins of olive oil. This is a serious menace, as foot

and mouth disease is in Italy and it is probable that some salami arriving at Sydney would contain viable virus. This is the most likely means of introducing foot and mouth diseases into Australian stock. The matter has been published in Italy, but that has not yielded a noticeable improvement.

Tinned Meats.—The cooking procedures for manufacture of tinned meats arriving from overseas were examined, in relation to individual products. Some were rejected because the cooking procedure had been insufficient to render the meat sterile. Most of the rejected goods were pig meats which could contain foot and mouth and swine fever viruses.

Imported Cattle.—The cattle yards and stalls at the Quarantine Station were disinfected following the death of three animals late last year. No further trouble of the kind occurred. Renovation and extensions to the cattle section of the Station were completed in time for the first shipment of cattle from United Kingdom in the 1955-56 season.

Reports were received from Fremantle and Melbourne that some cattle in the first shipment were exhibiting inflammation of the feet, and mouth ulceration. Special precautions were taken on their arrival at Sydney but in due course it was clear that the condition was not a serious disease, and the special restrictions were lifted.

Salv Vaccines.—Further monkeys were introduced from India and Malaya by air. Following the discovery of 8 per cent. incidence of tuberculosis in the monkeys which had arrived already, consignments in the latter half of the year were tested in the country of origin. Tests were made to ensure that air company and quarantine staff had not become infected and had some resistance to the disease.

Bovine Semen.—Three consignments were imported; including a consignment for this Department, from which 22 inseminations were made, with 10 resultant pregnancies.

Cattle Compensation Act, 1951.

The following claims were dealt with:—

Disease.	Claims.		Cattle.	
	No.	%	No.	%
Tuberculosis	4,893	65.6	10,301	75.2
Actinomycosis	1,393	18.9	1,705	12.4
Cancer	1,091	14.7	1,532	11.1
P.P.C.	43	0.5	210	1.5
Tick Fever	4	0.05	4	0.03
Johnes Disease	1	0.01	1	0.007
Trichomoniasis	23	0.3	32	0.2
Vibriosis	2	0.02	6	0.04
	7,450	...	13,791	...

Early in the year it was apparent that in several areas it was very difficult to deal with diseased animals following the receipt of notification by the owner. The position was remedied. On the far north coast an additional cattle inspector was appointed under the district veterinary officer; an acting inspector was appointed to the previously empty Narrabri Pastures Protection District; the Merriwa district, previously serviced from Scone, is now serviced from Mudgee; a veterinary officer has been located at Cooma to cover the Cooma and Bombala districts.

A claim is now accepted as lodged with the Department when it is lodged, along with the relevant stamped statement of sale, with the field officer concerned. This has improved the handling of claims in head office and further reduced the time taken to effect payment.

Stock Foods and Medicines Act, 1940.

Foods.—There were 840 foods registered during the year. Following the large-scale sampling undertaken in December, 1954, foods found to be deficient at that time were further sampled.

Towards the end of the year analyses and biological assay performed at the Veterinary Research Station showed a poultry Vitamin Supplement to have a Vitamin A content a quarter of that claimed by the manufacturers. The matter is being followed up to ensure that the deficiency is corrected.

A farmer lost 60 chickens following the use of a proprietary mash. A sample of the product and others made by the same firm were analysed and found to have a salt content in excess of the maximum claimed. The method of manufacture has been amended to obtain a more even distribution of salt in the products.

A mortality involving over 2,000 chickens focussed attention on a chick starter mash which was found to be grossly deficient in protein.

Medicines.—The work associated with the registration of stock medicines has been tabulated:—

Stock Medicines granted registration	1,347
Applications withdrawn	18
Application on which registration was deferred	54
Applications awaiting consideration	27

Total number of applications received for the year ended 30th June, 1956	1,446
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Number of meetings held during the year	18
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At the end of the year a reputable firm complained that claims made by some firms for a similar product to their own were extravagant. There were grounds for the complaint, and a direction has been given for an intensification of measures to protect the public against unscrupulous firms.

Swine Compensation Act.

Field officers continued inspections at butchering establishments to ensure that duty was paid in respect of each pig slaughtered. In vacant districts and in the Western Division only occasional inspections are possible.

Swine Branding Act.

The Act came into force on 1st July, 1955. Checking of brands shown on claims under the Swine Compensation Act in respect of tuberculosis has provided a great deal of information as to properties which are infected; and follow up actions are being taken in the field to control the infection in pigs and cattle.

Meat Inspection Service.

STATE ABATTOIR, HOMEBUSH BAY.

Inspection Staff.—Routine inspection was hampered by chronic shortage of meat inspectors. The daily deficiency below the number to man all positions ranged up to nineteen. However, three positions on the beef floor were regularly manned by Commonwealth inspectors and, on most days, five other positions were manned by Commonwealth inspectors for part of the day. All positions could be manned throughout the day's kill only when the kill was restricted through industrial disputes. Four meat inspectors appointed during the year were further trained at the State Abattoir under the supervision of a veterinary officer.

Commonwealth-State Co-operation.—The scheme continued as in the previous year. It provided some relief to the depleted State inspection staff but not enough. Rarely more than five Commonwealth inspectors were provided to assist the State Service although considerably more were invariably needed. Rarely were Commonwealth inspectors available to the State in any unit until the export pig kill was completed. The effect of the scheme has been maintenance of the State inspection staff at ten below strength without the deficiency being made up by Commonwealth assistance.

At country abattoirs there was no planned scheme for Commonwealth-State co-operation, but at practically all country abattoirs there was good co-operation. At several works most of the kill is inspected as between the two groups of inspectors and, at others, assistance is given whenever required by either the State or Commonwealth.

Hygiene and Inspection Facilities.—Improvement carried out at Homebush Bay included:—Alteration to the beef head chain, for more efficient inspection and washing; new stainless metal tables and tubs on the beef floors; alterations to the calf unit and passageways, to prevent contamination, from the floor, of long carcasses; replacement of the offal table in the calf unit; and facilities for quartering long backfatter carcasses on the pig floor, to prevent dragging on the floor of chillers and meat market.

Close liaison with officers of the Metropolitan Meat Industry Board was maintained on all matters affecting hygiene and inspection.



Meat Inspection Service's Condemnations.

The licenses of only six small slaughterhouses in the outer metropolitan area have been renewed. Of these, two have been completely rebuilt to approved plans and one other is in that course; whilst two have been re-modelled to approved plans and another is in that course.

(Photo. from Meat Inspection Service.)



Effect.

Veterinary staff in the Meat Inspection Service have devoted much time, with good effect, to architects and others concerned with abattoir construction or re-modelling; with stress on inspection facilities, hygiene, and working conditions.

(Photo. from Meat Inspection Service.)

Meat Market.—All meat entering the Meat Market at Homebush Bay was re-inspected by two market inspectors; entries day or night. Hygiene was closely supervised, particularly in vehicles used for meat carriage. Vehicles not conforming to Pure Foods Act standards were not permitted in the loading area. On information supplied by the Departmental market inspectors, forty-two prosecutions for smoking in the Meat Market were undertaken by the Department of Public Health.

Stock Inspected.—The number of each class of stock slaughtered at the State Abattoir and inspected by State inspectors decreased, in line with a general decrease in stock slaughtered throughout the State. Details of stock inspected at the State Abattoir, compared with the previous year, are given hereunder:—

Year.	Cattle.	Calves.	Pigs.	Sheep.
1954-55	200,176	121,021	157,259	2,460,490
1955-56	189,958	109,042	114,792	2,153,835

PRIVATE ABATTOIRS IN THE METROPOLITAN AREA.

Veterinary officers' supervision of inspection and hygiene at other abattoirs in the metropolitan area was again severely restricted by the shortage of veterinary staff. However, the two large abattoirs and six small slaughterhouses in the area were periodically visited, with effect.

Small Slaughterhouses.—The licenses of only six small slaughterhouses have been renewed in the outer metropolitan area. Of these, two have been completely rebuilt, to approved plans; two have been extensively re-modelled; one requires further work; and a new building is in course of erection by the sixth licensee.

Stock Inspected.—The cattle kill at private abattoirs in the metropolitan area increased but the kill of each other class of stock decreased:—

Year.	Cattle.	Calves.	Pigs.	Sheep.
1954-55	72,977	6,558	25,085	1,003,638
1955-56	83,813	4,636	19,203	896,870

KNACKERY INSPECTIONS.

The slaughter and spraying with methylene blue of horses killed within the metropolitan area for animal consumption were supervised. The Leppington knackery did not operate. Additions to the Riverstone knackery included a by-products processing unit, and chilling and freezing facilities; a substantial quantity of horse meat was exported for human consumption from these premises. At Riverstone 7,789 and at Smithfield 1,922 horses were killed, for a total of 9,711.

SALEYARDS INSPECTIONS.

Cattle sold at Flemington saleyards and at private saleyards and clearance sales within the metropolitan area were inspected at Flemington by a senior inspector stationed at Homebush Bay.

Flemington inspections include the identification and recording of all suspects and T.B. reactors consigned to the sales and the marking of any other cattle found to be diseased. Any cattle considered unfit to travel from the saleyards to the abattoir were destroyed at the saleyards, and the carcasses were transported to the abattoir for a special post-mortem examination. The numbers of cattle inspected were:—

Year.	Flemington.	Private Saleyards.
1954-55	235,433	3,506
1955-56	231,434	6,702

SHOP INSPECTIONS.

Retail butcher shops within the metropolitan area were inspected, primarily to detect any breaches of the Meat Industry Act, when the inspectors were not engaged in regular meat inspection duties. At the same time attention was paid to hygiene and the fitness of meat for human consumption. Departures from the principles of good hygiene were reported to the Chief Food Inspector of the Department of Public Health.

Minor breaches of the Meat Industry Act in regard to the sale of incorrectly branded meat were detected in three shops, and suitable warnings were issued.

A total of 4,328 shop inspections were made compared with 4,150 during 1954-55.

ENTRY OF MEAT INTO METROPOLITAN ABATTOIR AREA.

A licence under section 21A of the Meat Industry Act was granted by the Metropolitan Meat Industry Board to the North West Abattoir, Inverell, permitting slaughter of stock for introduction into the Metropolitan Abattoir Area. Several inspections were made, for standard of construction and hygiene before the licensing was recommended.

Quantities of meat introduced from N.S.W. country abattoirs showed little variation from the previous year, but increased quantities were introduced from Queensland. A consignment of twenty sides of beef was returned to Albion Park as the abattoir of origin was not licensed under section 21A of the Meat Industry Act. A consignment of 260 quarters of beef from Wangaratta, Victoria, was returned to Victoria because it was evident that a proper inspection had not been made at the time of slaughter.

OFFENCES UNDER THE MEAT INDUSTRY ACT.

A Windsor butcher was fined in respect of meat, for human consumption, not slaughtered and inspected according to the provisions of the Act; a butcher was fined in connection with smoking in the Meat Market at Homebush Bay; a man was fined for the illegal slaughter of sheep at Lidcombe; evidence of the illegal slaughter of sheep in the Windsor district was obtained but no court action was taken.

ABATTOIR DESIGN.

Advice was given to architects and local authorities interested in the construction of new abattoirs and the re-modelling of existing premises. The need to provide complete inspection facilities as well as adequate hygiene and good working conditions for inspectors and employees was stressed. The assistant principal veterinary officer devoted much time to preparing plans and constructional principles for small country slaughterhouses. Several such plans, etc., have been supplied to Shire and Municipal Councils. Plans for larger country works, suitable for central killing in an average district, were also prepared by him.

INSPECTIONS AT COUNTRY ABATTOIRS.

State meat inspectors were stationed at twelve country abattoirs and regularly visited three bacon factories, inspecting meat for introduction into the metropolitan area and meat for local district consumption; and the Commonwealth staff were assisted in the inspection of meat for export.

Inspections of meat for the metropolitan area were made at a further ten abattoirs and bacon factories, by approved personnel who were either Commonwealth inspectors or inspectors employed by the local government body.

Hygiene and Inspection Facilities.—Hygiene and inspection facilities improved at most abattoirs where State inspectors were stationed:—At Grafton and at Tenterfield new beef slaughtering floors were completed; at Wallangarra new freezers and chillers were built, and a new beef slaughtering floor is under construction; at Casino the pig slaughtering unit was re-constructed, and new chillers, freezers, and by-products plant were completed; and at Noree, Byron Bay, the lairages were concreted and the pig hoist was improved. At most abattoirs the identification of heads and edible offal with beef carcasses, so that all parts may be condemned with the carcase, has improved but is not yet satisfactory.

Stock Inspected.—There was a slight increase in each class of stock, except cattle, inspected by State inspectors at country abattoirs:—

Year.	Cattle.	Calves.	Pigs.	Sheep.
1954-55	298,252	320,326	285,157	465,353
1955-56	292,770	347,061	307,510	531,091

Meat Inspections—Diseases Encountered.

DISEASE CONDITIONS—CATTLE.

Tuberculosis.—The number of total condemnations for T.B. decreased; 4,099 condemned representing 0.72 per cent. of the kill, compared with 0.88 per cent. in 1954-55. The recorded 3,411 partial condemnations, 0.60 per cent. of the kill, do not reflect the incidence of tubercular lesions, since they do not include localised lesions in the gastro intestinal tract or thoracic cavity.

Actinomyotic Conditions.—The incidence of lesions diagnosed as either actinomycosis or actinobacillosis was 1.4 per cent. of all cattle inspected, compared with 1.3 per cent. for 1954-55.

Septicaemia.—This was the most frequent reason excepting T.B. for the total condemnation of beef carcasses; 431, or 0.08 per cent., condemned.

Neoplasms.—For cancer there were 174 total condemnations. The partial condemnations were almost entirely cancers of the eye, for which the heads and tongues were condemned.

Beef Measles.—Five cases of *Cysticercus bovis* infestation were detected, four at Homebush Bay and one at Auburn.

Liver Fluke.—Liver condemnations for fluke infestation increased.

Hydatids.—Liver and lung infestations were numerous, and accounted for some 10 per cent. of liver condemnations. Six cattle were totally condemned for hydatid infestation.

T.B. Reactors.—A total of 885 cattle was consigned, on Orders for Movement, for slaughter at Homebush Bay as positive reactors to the tuberculin test. The distributions of T.B. lesions were:—In head, 25 per cent.; in lungs, 15 per cent.; in intestinal tract, 15 per cent.; in carcass glands, 3 per cent. The totally condemned were 27 per cent., and the no visible lesions cases were 15 per cent. of the total.

Suspects.—The number of suspect cattle killed at Homebush Bay excluding reactors was 1,472. The post mortem findings on suspects were:—

Condition.	T.B.	Actinomy.	Actinobac.	Cancer.	Abscess.	Injury.	Others.	N.V.L.
Incidence	% 1.7	% 29.6	% 38.5	% 5.7	% 10.5	% 4.8	% 7.1	% 2.2

DISEASE CONDITIONS—PIGS.

Tuberculosis.—For all abattoirs, 0.52 per cent. of pigs were totally condemned for T.B., and 2.09 per cent. were partially condemned. The sum of total and partial condemnations was 2.5 per cent. of all pigs inspected, but this figure was considerably less than the total incidence of tubercular lesions detected.

Septic Conditions.—Total condemnations for various septic conditions including septicaemia amounted to 0.7 per cent. of the pig kill, compared with 0.6 per cent. in 1954-55. The diagnosis of septicaemia is largely based on the presence of petechiation of the kidneys, but recent work at the Veterinary School, University of Sydney, suggests that many lesions of the kidney diagnosed as petechiation are actually due to glomerulo nephritis. More work is necessary before the full significance of petechiae-like spots in the kidney may be known.

Arthritis.—Incidence, at 0.4 per cent. of the kill, was the same as for 1954-55.

Sparganosis.—As a result of the declaration of feral pigs as noxious animals no such pigs have been presented and no case of sparganosis was observed.

Kidney Worm.—This parasite was commonly observed at north coast abattoirs and was responsible for heavy liver condemnations.

Hydatids.—Carcass condemnations at Homebush Bay totalled thirty-eight, or 0.03 per cent. of the kill. Many carcasses the livers and lungs from which were lightly infested were hard frozen before release for consumption.

Ascaris Lumbricoides.—Liver damage by infestation led to condemnation of some 66 per cent. of livers at Homebush Bay.

DISEASE CONDITIONS—SHEEP.

Caseous lymphadenitis.—For all abattoirs, infection resulted in the condemnation of 0.03 per cent. of carcasses, and partial condemnation of 0.24 per cent. of carcasses. Incidence was comparable to that of 1954-55.

Arthritis.—Total condemnations were 0.03 per cent. of the kill, and partial condemnations 0.11 per cent. Incidence increased sharply over the 1954-55 figures (0.016 per cent. and 0.092 per cent.), particularly polyarthritis for which the carcasses were totally condemned.

Neoplasms.—Total condemnations for cancer at the State Abattoir were 0.01 per cent., as for 1954-55.

Parasitic Infestation.—Hydatid and fluke necessitated the condemnation of a high percentage of livers at all abattoirs. *Cysticercus ovis* infestations were seen spasmodically; at Homebush Bay fifty-nine carcasses were condemned for this condition.

STOCK INSPECTED (EXCLUDING EXPORT) BY THE MEAT INSPECTION SERVICE—DEPARTMENT OF AGRICULTURE.

Place of Slaughter.	Type of Stock.				
	Cattle.	Calves.	Pigs.	Sheep.	Horses.
State Abattoir	189,958	109,042	114,792	2,153,835	...
Licensed Works within Metropolitan Abattoir Area.....	83,813	4,636	19,203	896,870	...
Licensed Works in Country Areas	292,770	347,061	307,510	531,091	...
Knaackeries	7	...	...	...	9,711
Totals	566,548	460,739	441,505	3,581,796	9,711

CONDEMNATIONS BY MEAT INSPECTION SERVICE—DEPARTMENT OF AGRICULTURE—AT TIME OF SLAUGHTER AT STATE ABATTOIR AND PREMISES LICENSED UNDER THE MEAT INDUSTRY ACT.

Condition.	Total Condemnations.				Partial Condemnations.			
	Cattle.	Calves.	Pigs.	Sheep.	Cattle.	Calves.	Pigs.	Sheep.
Actino	5	...	...	...	8,051	...	4	...
Arthritis (includes Polyarthritis).....	14	21	327	924	213	6	1,598	3,964
C.L.A.	...	...	...	1,007	...	...	...	8,805
Cysticercus Ovis	...	...	...	62	...	...	...	...
Emaciation	407	75	79	2,350	...	...	...	...
Sarcosporidiosis	...	...	...	172	...	...	...	...
Septic Conditions	517	144	3,205	529	219	10	787	847
Tuberculosis	4,099	118	2,302	...	3,411	14	9,244	...
Others	560	2,378	492	2,198	1,578	41	2,036	3,508
Totals	5,602	2,736	6,405	7,242	13,472	71	13,669	17,124

Board of Tick Control.

ERADICATION CAMPAIGN.

Continuation of Preparation for Eradication Campaign.—Preparations continued, from the preceding year, until the dipping programme commenced on the 9th January, 1956, for the Eradication Campaign in the Kyogle Tick Quarantine Area and Tick Quarantine Areas west of the Richmond Range.

The Board's fencing programme was completed in September, 1955. Graveling of dipyards in all eradication areas continued but was not completed prior to the commencement of eradication actions. Dip construction for the eradication areas was timely completed. The repairing of all dips within the eradication areas continued, and was practically completed by the end of December, 1955.

Leasing of unmusterable country was completed by the two senior inspectors. In the eradication areas 400,600 acres were leased, at a cost of £232,800 for the period of sixteen months. Closing this area involved the movement of some 40,576 cattle and 2,556 sheep.

Stockowners' fences in the eradication areas were in practically all cases renewed, or repaired as required, prior to commencing the campaign. Legal action was taken in the cases of a few stockowners. Except for two owners, that work was completed by early 1956.

Dips which had been charged with arsenic in the eradication areas were emptied and re-charged with D.D.T. (rucide), prior to 9th January, 1956. The few B.H.C. dips which had been installed in Kyogle Area and Areas west of the Range were changed over to rucide. A total of 367 dips in the eradication areas was charged with D.D.T. for use during the campaign.

During November and December, 1955, the staff patrolled all forest country and the leased areas to ensure that all stock had been removed. Unmusterable stock had to be shot; forty-seven cattle and nineteen horses were destroyed by the staff.

Some animals unfortunately were not destroyed until after the eradication campaign commenced, because of the natural difficulties of the country concerned. Three head of cattle were destroyed in the Toonumbar State Forest, Kyogle area, in April, 1956. In the Ewingar State Forest, Tabulam section, some horses were destroyed between December, 1955, and June, 1956, but the country could not be guaranteed empty even then. Staff are still actively trying to locate any remaining horses. Fortunately, such animals have been confined to forest country.

In some leased areas, stockowners did not remove all their stock by the stipulated time. Consequently fourteen holdings must be kept empty of stock for varying periods to beyond 30th March, 1957.

Kyogle Tick Quarantine Area and Tick Quarantine Areas West of the Richmond Range.—The fifteen months dipping programme for eradication commenced in Kyogle, Woodenbong, Bonalbo, Tabulam, Cheviot and Rivertree and Bookookoorara Quarantine Areas on 9th January, 1956, and in Cullendore Quarantine Area on 5th March, 1956, with, in general, the full co-operation of stockowners. All stock were treated on their due date in the first round, with the exception of three herds in one isolated locality. Following the issue of the orders no further action was necessary.

Because of incomplete musters some herds had to recommence their eradication treatments. Most herds had incomplete musters in the first two rounds, and occasional breakdowns occurred thereafter. In consequence it was apparent by the end of the 12th round that the following numbers of herds would have to undergo one or more additional treatments after the fifteen months' dipping programme ends in March, 1957: Kyogle North, 19; Kyogle South, 20; Tabulam, 35; Bonalbo, 15; Woodenbong, 9; Cheviot, 1; and Cullendore, 7.

The eradication area in this Phase 1 is approximately 2,090 square miles, involving 1,535 holdings; and 200,172 cattle, 7,487 horses, and 685 sheep and goats, were treated in the initial round. The number treated in the subsequent rounds has gradually decreased, due to normal movement of stock from areas west of the Range to clean country during the autumn, and to abattoirs within the Richmond Quarantine Area.

The 12th round has been completed, with the exception of Cullendore which has only completed eight rounds, and the totals of stock treated to the end of these rounds were as follows:—

	Dipped.	Sprayed.
Cattle	2,333,195	715
Horses	87,139	3,125
Sheep and Goats	5,120	—

The losses associated with dipping, either by drowning or by injuries, have been limited. Most were experienced in the first few rounds. A total of 91 cattle and 17 horses have died from drowning or aspiration pneumonia, or have been destroyed on account of injuries associated with dipping, over the first twelve rounds.

The total losses from all causes such as old age, diseases, killed by dingoes, etc., within these eradication areas, over this same period, amount to 2,814 cattle, 152 horses, and 89 sheep and goats.

The appearance of Ephemeral Fever in January caused some difficulties but did not necessitate deferment of the eradication programme.

Detection in Boonoo Boonoo Area.—As reported last year, in February, 1955, two single cattle tick infestations were detected at Cullendore and, as a result, the Boonoo Boonoo Tick Quarantine Area was gazetted. Subsequently, on stockowners' representations, a small area designated Cullendore Tick Quarantine Area was gazetted. This, which included the area in which the ticks were located and a reasonable amount of country to the south of the properties involved, was included in the eradication programme for Phase 1.

In January, 1956, at Stanthorpe Dipyards, a single tick infestation was detected in cattle which had originated from Undercliffe within the Boonoo Boonoo Tick Quarantine Area. Subsequent inspection of stock remaining on the holding revealed a further single tick infestation.

As a result an eradication programme for the Boonoo Boonoo Tick Quarantine Area has become necessary but the date of commencement is still not certain. It will depend on the realignment of the fence along the Queensland-New South Wales Border from south of Cullendore to Sugarloaf. The necessary dips are being constructed within the Boonoo Boonoo Area, to ensure that the Area is ready for eradication treatments by 1st April, 1957.

When the Boonoo Boonoo Area was gazetted it was accepted that no Queensland cattle would be permitted into the Area, in accordance with the policy for all Tick Quarantine Areas. On representations from stockowners in the Area, it was subsequently agreed that certain cattle from Queensland could be introduced into the Boonoo Boonoo Area, in which no ticks had actually been detected. That policy is still in operation.

DETECTION OF FURTHER ARSENIC RESISTANT TICKS.

(a) *Richmond Quarantine Area.*—During June, 1955, observations on the results of treatments of an infested herd at Nimbin, adjoining a property on which arsenic resistant ticks had already been reported, showed that arsenic treatments were largely ineffective. Therefore, a further dip (Bob's dip) in the Nimbin Area was charged with D.D.T. in July, 1955.

In April, 1956, observations on a further herd in the Nimbin district, adjoining the one aforementioned, showed that arsenic was not eliminating the infestation, and it was essential to charge a further dip (Morton's Dip) with D.D.T. Subsequent treatments eliminated the infestation, no ticks having been observed since prior to the first treatment.

In the same period a herd at Dunoon was found infested and eight fortnightly arsenic treatments failed. No connection was found between this infestation and any other known arsenic resistant infestation. It was necessary to charge a further dip (Currie's Dip) with D.D.T. to deal with this infestation.

The position in the Richmond area at the end of June, 1956, is that four dips in the Nimbin section and one at Dunoon are charged with D.D.T. to control arsenic resistant ticks.

(b) *Tweed Quarantine Area.*—The report for 1954-55 indicated that arsenic resistant ticks were suspected in parts of the Piggabeen Area and at Numinbah. Observations which continued during July and August, 1955, confirmed that arsenic resistant ticks were present in both herds concerned in the Piggabeen area and the one at Numinbah. Thus it was necessary to charge two additional dips (King's Dip at Piggabeen, and Numinbah Dip at Numinbah) with D.D.T.

At the end of June, 1955, there were nine dips charged with D.D.T. in the Tweed Quarantine Area to deal with arsenic resistant ticks. These dips are at Piggabeen (3), Numinbah (1), Upper Crystal Creek (1), Zara (1), Terranora (2), and Condong Range (1).

(c) *Kyogle Quarantine Area.*—No further arsenic resistant tick was detected in this area prior to the commencement of the eradication campaign, but they may have been present on some holdings within the special quarantine areas gazetted.

(d) *Tabulam Quarantine Area*.—Arsenic resistant ticks were suspected on three properties near Emu Creek and a dip was charged with D.D.T. for the treatment.

TICK FEVER OUTBREAKS.

Mullumbimby.—During December, 1955, several cows on a property south of Mullumbimby were passing red water; one animal died and post mortem examination indicated tick fever. Glenfield Veterinary Research Station's examination of smears confirmed the presence of *Babesia argentina*.

Inspections of holdings from which calves had been introduced on to this property did not reveal evidence of tick fever having occurred on any of these holdings.

No further deaths occurred and the normal policy treatments have been carried out.

CHARGING OF CLEANING DIPS WITH D.D.T.

In July, 1955, the Federal Cattle Tick Control Commission decided, in view of the presence of arsenic resistant ticks, in several Tick Quarantine Areas, to amend the policy treatments required for the movement of stock to clean country. The new policy required that the three treatments in hydrocarbon dips, should be at intervals of five to ten days. Subsequently this was further amended by reducing the treatment intervals to three days, since there would be no risk of poisoning as was the case with arsenic.

Certain dips in strategic centres have been charged with hydrocarbon for treatment of stock moving to clean country and for treatment of stock moving into eradication areas. The following dips have been charged with hydrocarbon in the areas outside the present eradication areas; to cover those movements:—Tweed—4 dips, plus 1 calf dip; Bangalow—5 dips, plus 1 calf dip; Lismore—8 dips, plus 1 calf dip; Casino—15 dips, plus 1 calf dip and Boonoo Boonoo—5 dips.

In view of the possibility of B.H.C. resistance developing in ticks, eventual elimination of all B.H.C. dips was decided; and action has been taken to eliminate all such dips in the Tweed area and recharge them with D.D.T. All B.H.C. dips in the eradication areas have been recharged with D.D.T. and when the present supplies of B.H.C. have been exhausted the remaining eight dips will be similarly treated.

OUTCOME OF POLICY ALTERATIONS EAST AND WEST OF THE RICHMOND RANGES.

As indicated in the 1954-55 report, the necessity to prepare the eradication areas prevented the retention of sufficient staff in the Richmond and Tweed Quarantine Areas to fulfil the normal control policy. In 1955-56 all dips were maintained in these areas and stockowners were encouraged to carry out voluntary treatments of their herds. Unfortunately, only a small proportion actually carried out regular treatments. The average percentages of stock in these areas treated during the nine months from October, 1955, to June, 1956, were as follows:—Bangalow, 2.8 per cent.; Lismore, 8.4 per cent.; Casino, 7.8 per cent.; and Tweed, 17.2 per cent. Infestations in these areas became more widespread as was to be expected. The following information concerning infestations over the last three years is relevant:—

Bangalow	26	44	87
Lismore	6	72	105
Casino	12	17	77
Tweed	274	184	97

It can be anticipated that the position will deteriorate, as there will be no possibility of implementing a normal control policy in these areas during 1956-57.

At the start of the eradication programme a policy of treatment of herds on properties adjoining the Kyogle and Tabulam Quarantine Areas was instituted. All herds in these areas have been placed on twenty-one day interval treatments, on similar lines to the policy for properties adjoining the southern Richmond Quarantine Area boundary. There the policy has been fourteen day intervals between treatments, except in certain circumstances.

Fencing.—Forty-six miles of new fence and 35 miles of repairs were completed; distributed over the Woodenbong, Kyogle, Lismore, Boonoo Boonoo, Tabulam, Bonalbo and Tweed areas.

Dip Construction.—Twenty dips were constructed by contract:—Kyogle, 11; Tabulam, 2; Bonalbo, 3; Cheviot, 2; Cullendore, 1; and Woodenbong, 1. In addition the Dip Maintenance Gang constructed ten dips:—Boonoo Boonoo, 4; Cullendore, 2; Tabulam, 2; and Casino, 21; and a stockowner in the Kyogle area built one.

OPERATION OF FLYING GANGS IN CLEAN COUNTRY.

Flying gangs were again sent into clean country in January, 1956, south of Boonoo Boonoo Area and west of Cheviot area. In four months, to April, they examined 3,354 head of stock.

During May, 1956, two flying gangs were established in the Grafton-Macleay areas, to investigate the possibility of ticks being there. By the end of June seventy-eight herds had been examined but no evidence of cattle tick had been found. Numerous specimens of *Haemaphysalis* species were collected and submitted to the Entomological Branch for confirmation of identification.

INVESTIGATORY ACTIVITIES, AS WITH THE ANALYST.

Stirring of Hydrocarbon Dips.—The methods of stirring hydrocarbon dips have been investigated and a definite procedure has been laid down.

A dip allowed to stand for more than two hours must be stirred, using a shovel and rope technique, to ensure that the sediment is incorporated in the dip fluid, and subsequently ten head of large cattle must be passed through the dip as stirrers.

Prior to the carrying out of these trials, it had been the policy to use up to twenty stirrers.

Use of Hard Waters in D.D.T. Dips.—In preparing for the eradication campaign certain waters were found to be incompatible with ruicide, owing to hardness, and it was necessary to add calgon as a water softener. In a few cases the waters were too hard and alternative water supply had to be arranged for the particular dips.

As the result of investigations the policy now is that all waters used in ruicide dips should be sampled and analysed each month. The analyst advises the field staff of the results, stating the quantity of calgon required to soften the water enough for use.

Estimation of D.D.T. in Hair and Wool.—Hair samples have been collected on numerous occasions from cattle dipped in ruicide, and interesting figures have been obtained concerning the amount of D.D.T. which remains on the hair. The variations from animal to animal and from dip to dip are wide. Figures obtained from ruicide dips in operation in this area have ranged from 20 to 70 mgm./gm. of hair.

Stripping of Ruicide Dips.—The Tick Board's analyst is participating in investigations of the problem of stripping of ruicide dips. This work arose from the fact that consumption of ruicide within eradication areas was considerably greater than had been anticipated. Investigations revealed a wide range in D.D.T. consumption rates, from as low as 0.081 lb. of ruicide per head of cattle to as high as 0.139 lb. of ruicide per head.

Observations have indicated that the degree of stripping is related to the particle size of the D.D.T. crystals and that crystallization is affected by the presence of salts, clays, organic matter, etc.

Estimation of D.D.T. in Cream and Butter.—This work has been carried a stage further by the analysis of butter samples. Appreciable quantities of D.D.T. have been detected in the various samples submitted.

Toxicology of Arsenic.—The arsenic toxicology studies have not yet been completed.

Toxicology of D.D.T.—In conjunction with the Director of Veterinary Research the amount of D.D.T. which can be fed to mice and calves without producing symptoms indicative of D.D.T. poisoning is under determination. The Tick Board's analyst carried out all of the analyses of mice and calf specimens.

Toxicology of B.H.C.—Work has not yet been completed in regard to the analyses of specimens submitted in connection with the dipping trial at the Glenfield Veterinary Research Station.

Estimation of B.H.C. in Meat, Hides, etc.—Complaints from an abattoir that sausages were tainted as a result of the policy of dipping calves in B.H.C. prior to slaughter were investigated; and it was found that the hides and meat of calves dipped on the day of slaughter contained more B.H.C. than hides and meat of calves dipped on the day before slaughter.

Sensitivity of Horses to D.D.T.—Field investigations on the occurrence in the eradication areas of a syndrome, in horses, seen during the early stages of the dipping programme, an affect in the upper respiratory tract, suggested that the symptoms were due to a solvent in the rucide. Further observations will be made, to determine the ingredient causing the symptoms.

Analyst's Statistical Report.

Arsenical concentrate manufactured	2,300 gallons.
Arsenical concentrate distributed	4,640 gallons.
Arsenical dips analysed	7,359
Samples of arsenical concentrate for manufacturing purposes .	23
D.D.T. dips analysed	3,429
B.H.C. dips analysed	198
Water samples analysed in connection with DDT dips	2,720
Cattle dipped in arsenical dips	518,045
Cattle dipped in DDT dips	2,979,889
Cattle dipped in BHC dips	128,428
Paint manufactured	776 gallons.

Queensland Border Control.

WESTERN SECTION.

Heavy floodings in this area have restricted stock movement. Some crossing places have been isolated since February.

GOONDIWINDI SECTION.

Stock Movements.—Despite long periods of inactivity due to unprecedented floodings in the border river system, stock movements from Queensland into this State increased by comparison with recent years; but there was a marked decrease in stock movement from New South Wales into Queensland.

Cattle ex Queensland arriving at the border were generally in good condition and appeared healthy, except for those with ephemeral fever. No report was received of P.P.C. incidence in cattle which had passed through this Section. Some sheep, moving to and from New South Wales, more particularly west of Goondiwindi, were lice infested.

From Queensland into New South Wales, the following stock: fat cattle 22,008, store cattle 188,217, a total of 210,225; fat sheep 8,001, store sheep 160,118, total 168,119; fat pigs 51, store pigs 49, total 100; horses 36; compared with the previous year a cattle increase of 64,820, sheep increase of 13,841, a pig decrease of 300, and a horse decrease of 129.

From New South Wales to Queensland: fat cattle 1,805, store cattle 13,699, total 15,504; fat sheep 12,238, store sheep 140,218, total 152,456; fat pigs 106, store pigs 99, total 205; horses 278; compared with the previous year a cattle decrease of 5,439, a sheep decrease of 209,291, a pig increase of 69, and a horse increase of 241.

Dips.—Dips within the Section were charged with D.D.T. and dipping fees increased, following the change-over from arsenic. More stock was dipped.

Goondiwindi Dip yards were repaired and also the yards at Keetah, extensively damaged in the January, 1956, floods. The Department accepted the use of a private dip at Bonshaw.

Fencing.—The Border fences were extensively damaged by floods and considerable difficulty has been experienced in securing their repair. They are mostly privately owned.

STANTHORPE SECTION.

Stock Movements.—Stock movement from Queensland into New South Wales at this section of the Border markedly increased; cattle, 217,243; sheep, 25,726; pigs, 55,393; horses, 372; representing 61,198 more cattle; 19,451 more sheep; 25,488 more pigs, and 178 more horses than in 1954-55.

Movements from New South Wales to Queensland amounted to 3,533 cattle; 47,605 sheep; 10 pigs, and 468 horses; by comparison with 1954-55 an increase of 1,050 cattle, a decrease of 44,779 sheep, a negligible increase in pigs, and an increase of 125 horses.

Considerable numbers of stock crossed to meat works at Wallangarra and Tenterfield, and dipping treatment and fees were not involved in those cases. There was, however, a keen inquiry for store cattle, considerable numbers of which have

crossed to N.S.W. Had rolling stock been available, the volume would have been much greater. Prolonged wet periods and floodings have greatly reduced the movements of sheep and cattle on the hoof.

Papers accompanying stock were generally satisfactory and agents have co-operated well. There were, however, considerable movements from Special Areas where stock had not received any treatment prior to arrival at the Border. A matter for action with Queensland authorities.

Movement of Hay.—Heavy cattle tick infestations in Queensland's Schedule T, and the fact that substitution of hay lots occurs as between agents and purchasers in Queensland necessitate revision and tightening of restrictions on hay introductions to New South Wales, particularly in view of the tick eradication campaign and anticipated release of those areas.

Fencing.—Due to the discovery of cattle tick outside the Cullendore Quarantine Area, further areas of New South Wales were quarantined and, as the northern and western boundaries of these were contiguous to the Queensland Border it was necessary to revise and refence this boundary for watershed purposes. Some 18 miles of new fencing was erected by the Board of Tick Control between Acacia Creek and Maryland.

Further fencing will be required to complete the boundary of Boonoo Boonoo Quarantine Area prior to eradication. Therefore an additional revision, of approximately 48 miles of the Border, has been carried out and the proposed line blazed, through rough, monolithic country, subject as yet to a survey to determine encroachment.

More repairs and additions were made to the netting fence controlled by the Darling Downs Rabbit Board, the Department meeting half the cost. Other lesser fencing works were achieved.

Registered Paddocks.—Owners of registered paddocks have complied with the regulations, and maintenance of back boundaries of the whole of the registered system is excellent. Registered holdings on the river, however, have been seven times subjected to severe flooding. The fences in many cases were completely washed away. Temporary repairs have been made, pending the river level subsiding. Meanwhile the volume of water precludes the passage of stock.

Dips.—Wallangarra and Stanthorpe dips were charged with rucide. Necessary modifications to yards were carried out. Dipping fees were increased to 8d. per head for large stock and 4d. per head for calves and sheep.

The use of privately-owned Mingoola dip was lost to the Department, at least temporarily.

Glenfield Veterinary Research Station.

GENERAL.

The area embracing the Station remains unchanged at 600 acres, subdivided into 43 paddocks. With the co-operation of the Department of the Army, paddocks 23-43 have been surveyed, measured and mapped. Paddocks 1-22 will also be surveyed and mapped by the Army Survey Unit.

The area under cultivation this year comprised 114 acres. Sixty acres were sown to oats, yielding 60 tons of hay. Forty acres were sown to grasses and clovers, and 14 acres to miscellaneous crops for green fodder for small laboratory animals, rabbits and guinea pigs.

Mr. P. B. Setchell, B.V.Sc., left for the United Kingdom in August, 1955, and is continuing his studies, on the encephalopathy of sheep associated with hypoglycaemic conditions, at the Department of Animal Pathology, University of Cambridge, under Professor W. I. B. Beveridge.

Mr. R. Layland, laboratory assistant, was granted leave without pay in September to undertake an assignment to British North Borneo under the Colombo Plan.

Field Days.—Two field days were held, one for members of the Institute of Inspectors of Stock and the second for the Pastures Protection Boards' delegates.

There has been an ever-increasing number of requests for the attendance of the Director of Veterinary Research and other officers to give addresses at conferences of primary producers and sessions at field days. It has been necessary, with regret, to refuse some invitations.

Visitors.—Many overseas visitors, too numerous for listing herein, came to the Station for information on a wide range of topics, and there was a notable increase in the number of visitors from Japan.

Colombo Plan and F.A.O. Fellows.—Facilities continued to be provided for visiting Fellows. Six Fellows, variously from Cyprus, Burma, India, and West Pakistan, were accommodated at periods of the year.

VETERINARY DIAGNOSTIC SERVICES.

The volume of diagnostic material received was heavy. For the third successive year the entries in the Specimen Register exceeded 4,000, being 157 in excess of 1954-55 and only 22 less than 1953-54.

Specimens Examined.	1953-54	1954-55.	1955-56.
Cattle	14,247	10,410	16,083
Sheep	1,456	695	867
Horses	107	85	37
Pigs	1,307	1,448	1,279
Poultry	4,401	3,444	5,161
Miscellaneous Animals and Birds	239	225	227
Miscellaneous other specimens	1,201	732	580
Grand Total	22,958	17,039	24,234
Entries in Specimen Register	4,192	4,013	4,170
Inspections under the Provisions of the Noxious Microbes Act	27	17	15

Publications.—It has been possible despite staff changes to maintain the continuity and volume of scientific papers recording original observations by research officers. During the previous year 37 papers were published, the largest number published during any financial year. This year 33 papers have been published. With one exception, all were accepted by the Editors of Australian journals; mainly the Australian Veterinary Journal and the Australian Journal of Agricultural Research (APPENDIX II—Publications.)

VETERINARY RESEARCH—CATTLE.

Artificial Stock Breeding Station, Berry.—On a unanimous recommendation by the Advisory Committee on Artificial Insemination established by the Minister in December, 1954, the administration of the Artificial Stock Breeding Station at Berry was passed to the New South Wales Milk Board in April, 1956. This conforms with the management of A.I. centres in the United Kingdom and New Zealand and is certain to accelerate the rate of development of provision for artificial insemination throughout the dairying districts of the State. The agreement reached between the Milk Board and the Department provides that the administration, trading and development will be the responsibility of the Milk Board, whereas technical advice and research on artificial insemination will continue to be a function of Glenfield Veterinary Research Station of the Division of Animal Industry, Department of Agriculture.

Artificial Insemination of Dairy Cattle.—Since the opening of the Berry centre in October, 1952, 13,000 first inseminations have been performed. This year first inseminations have exceeded 4,700, in addition to 2,423 doses of semen sold to operators outside the zone covered by the Centre. During July and August, 1955, the demand for the service was very heavy owing to the quota system fixed by the Milk Board for winter production. Some excellent conception rates, 90 per cent. and better, have been obtained in individual herds on first inseminations. The mileage covered per insemination, namely 8.2, compares very favourably with overseas countries.

Twenty ampoules of Friesian semen stored at low temperature were received by gift from the United Kingdom through the generosity of Horlicks Ltd. The semen, from the bull H. Adema 66, which is highly regarded by Friesian breeders in England and Australia, has been in poor demand from New South Wales breeders. The conception rate has not been good. Some ampoules remained on hand at the close of the year.

Semen has been available only from three breeds of dairy bulls, Friesian, Ayrshire and A.I.S., but wider coverage should soon be available. Difficulty has been experienced in procuring good quality bulls. In many cases merit sires are not available for sale to A.I. Centres, and potential herd improvers often do not conform to herd society standards. In other cases, bulls revealed as herd improvers by their daughters' production have gone out of service by the time the facts are available and breeders have regretted the non-availability of these sires. The provision of low-temperature storage facilities would correct this position or at least prolong the availability of semen from such sires.

Twenty-three bulls have been procured for Berry since the Centre commenced operations; three of them were useless as donors and never used, while another proved unsatisfactory after one month.

Towards the close of the year the first figures for a dam-daughter production comparison became available. The daughter, sired by A.I. from a Friesian bull at the Centre, on 300 day test and under comparable conditions gave 6,390 lb. milk, 247.8 lb. butterfat, as against 3,750 lb. milk and 189.3 lb. butterfat for the dam, or 41 per cent. increase on the dam's production. Curiously enough the bull is not popular with local Friesian breeders purely on phenotype, which apparently has little correlation to the important factor, production, in the animal's make-up.

Sealing of Ampoules in Semen Freezing.—Improvement in methods for the sealing of ampoules in semen freezing is under investigation. Liquid paraffin has given some promise. It has many favourable properties, e.g., it is harmless to bovine semen in the liquid state, and solidifies at a suitable stage in the semen freezing process, remaining clear, without cracking the glass tubes. It forms an effective seal. The process has many advantages over the prevailing method of heat sealing with attendant risk of raising the temperature of the semen.

The method possesses the advantage of enabling a greater number of ampoules to be stored in a given space at low temperature.

Toxicity of Benzene Hexachloride for Cattle.—This experiment, commenced early in 1955 (aims and objects detailed in the 1954-55 Report) was concluded.

Calves randomised into two groups of six were dipped in gamatik a proprietary benzene hexachloride earlier used in certain dips in the Tick Quarantine Area, but later replaced by a D.D.T. The calf groups were dipped at intervals of seven and fourteen days, respectively, in the formulation at a concentration of approximately 0.56 per cent. of all isomers of B.H.C. The treatments commenced on 22nd March, 1955 and concluded on 20th December, 1955. The bath was sampled each fortnight, and total and gamma isomers were determined at the Laboratory, Board of Tick Control, Lismore. Wide variations in climate were experienced during the experiment. In March, 1955 the atmospheric conditions were excessively humid with temperatures of 80°F. and high rainfall. From the end of May throughout the winter, rainfall and humidity were low with numerous frosts in July and temperatures below freezing point. A minimum of 31°F. was recorded on 2nd August, 1955. A maximum temperature of 90°F. was recorded in November.

At the termination of the dipping one of the weekly dipped animals was destroyed for autopsy. There was no evidence of any gross pathological change. Liver, kidney, brain, renal and omental fat were sampled for analyses for total and gamma isomers of B.H.C., the analyses being undertaken at the Laboratory, Board of Tick Control, Lismore. The analyst's figures were not available by the close of the year.

Throughout the dipping none of the calves in either group showed any manifestations of the syndrome associated with B.H.C. toxicity in bovines. The calves gained weight and the variation in climatic conditions experienced over the period of the experiment did not appear to exercise any significant effect on the health of the animals.

Bovine Trichomoniasis.—Investigation of a number of outbreaks of abortion in cows, particularly amongst dairies on the north coast, has confirmed the suspicion that bovine trichomoniasis is fairly extensive in N.S.W. dairying districts.

The survey at the State Abattoir, of the incidence of cystic formation of the vaginal Gartner canal of dairy cows passing through for slaughter, has not revealed a further case of this condition. It would seem that this observation reported in the 1954-55 report, that *Trichomonas foetus* infection can become localised indefinitely in the Gartner canal of the vagina, is one of the exceptional sequels to this infection in the cow. By far the greater proportion of cows will self-cure from *T. foetus* provided they remain unmated over three to four periods of oestrus.

The strain of *T. foetus* operating in this State has now been typed and shown to be the "Belfast" strain, the common strain operating in the United Kingdom.

A case has been encountered of a cow aborting at seven months from the dual infection of *T. foetus* and *Br. abortus*.

The intervention of other work, and failure to be satisfied that a suspect carrier bull was an actual carrier of the infection, has deferred temporarily further studies on the prophylactic treatment of infected bulls' semen with glycerol and low temperature storage.

Vibrio foetus Infection.—The appearance of this infection in dairy cows at both Hawkesbury Agricultural College and the Glenheid Veterinary Research Station has caused serious concern. Whilst it will permit a more intensive study of the infection, and its significance in bovine infertility, the origin of the infection is puzzling.

The presence of the infection in this State was recorded some years ago, but was not regarded as widespread. This is in contrast to Victoria where it would seem that *V. foetus* is more common than trichomoniasis, the reverse being the case in N.S.W. The diagnosis and longevity of the infection in cows are being studied.

Leptospirosis in Cattle.—The general serological survey work continued, on a reduced scale, but increasing numbers of sera are being submitted for assistance with diagnosis of sickness and death in cattle. During the year 310 bovine sera from 78 separate properties were examined. Icterohaemoglobinuria in calves was confirmed serologically as leptospirosis on nine properties situated on the north, central and south coasts, the southern tablelands and in the central west.

A transient illness in dairy cattle on three properties was, on strong serological evidence suspected of being due to leptospiral infection. Such cattle became lethargic, with a high temperature and markedly reduced milk yield, but after 5-7 days recovered without treatment. A number of animals aborted in each herd, while calf mortality associated with haemoglobinuria occurred on one property. On four other properties abortions without other clinical symptoms of ill health were suspected, on serological grounds, to be due to leptospirosis.

Observations continued on the persistence of leptospiral agglutinins in a small number of cattle on one property where clinical evidence of leptospirosis has never been observed. One animal has now shown agglutinins against *L. pomona* to a titre of 1 in 1,000 consistently for three years, while a second animal has shown a slow drop in titre from 1/1,000 to 1/100 over the same period. These observations assist in interpreting serological results, and indicate that even high titres do not necessarily indicate recent infection with leptospire.

Milk Fever Complex.—The milk fever studies on the Guernsey herd at Yanco Experiment Farm were continued. Progress has been hindered by the non-occurrence of cases in the herd, as it was intended to examine further the value of phosphatic supplements in the prevention of the disease under grazing condition.

Work on the pathology of the parathyroids of the bovine and ovine continued. It has revealed that in these animals oxyphilia is not a common condition. Aged cattle subject to recurring attacks of milk fever show marked fibrotic changes in the parathyroid glands.

Acetonaemia in Cattle.—There has been a relatively high incidence of acetonaemia in dairy cattle in the County of Cumberland. Analyses have been undertaken on a large number of specimens. Incidence of the condition in this region closely follows the seasonal nutritional trends and is prevalent when grazing conditions are adverse.

Hypomagnesaemia in Cattle.—In the spring of 1955 outbreaks were common in dairy cows in the County of Cumberland. It was seen in one herd receiving concentrate feeding with grazing. Biochemical serum analyses revealed a high incidence in herds in the Bowral-Kangaloon area.

Bovine Mastitis.—Some interesting results were obtained in the control of bovine mastitis, streptococcal and staphylococcal, in an outbreak amongst the experiment herd at the Macquarie Fields dairy. An intensive eradication campaign was adopted, employing regular bacteriological examination of milk, antibiotic treatment, and a high standard of dairy hygiene. By these means the incidence of infecting organisms in the udders has been reduced to a very low level.

Hypocuprosis in Cattle.—This condition is evident in nine herds on the north coast. The survey is being continued. The affected properties show similar topography: low lying swampy, liable to flooding, and situated at the mouths of coastal rivers. Treatment trials have indicated that intra-muscular injections of copper salts give the greatest and most prolonged elevation of liver copper concentration.

A controlled experiment was commenced at Glenfield recently, to determine the effect of sulphate and manganese on the copper status of cattle. The sulphate has caused a significant reduction in liver copper concentration but, as yet, not to hypocuprotic levels.

VETERINARY RESEARCH—SHEEP.

Mycotic Dermatitis.—The extensive rainfall throughout the sheep raising districts provided optimum environmental conditions for skin infection of sheep with the fungus *Acremonium dermatomomus*, the etiological factor of mycotic dermatitis.

The treatment and alleviation of this condition in sheep have presented a problem for years. Numerous compounds and formulations have been investigated but results have never been promising. This year field trial using two proprietary preparations and sodium iodide was undertaken on a northern property. The results were not convincing. Sodium iodide proved dangerous owing to the propensity of the ovine to iodism.

Ovine Brucellosis.—Investigations continued in the Dorset Horn stud, on the central tablelands, mentioned in the 1954-55 report. Several ewes which serologically became positive reactors following mating with an infected ram, were removed from the flock. The infected ram, which showed lesions of the epididymus, subsequently proved fertile.

Investigations were undertaken on some of the leading Merino studs. Rams were clinically examined; all showing any abnormality of the epididymus were tested serologically. The semen was examined bacteriologically and for fertility. None of these rams was shown to be infected with *Brucella ovis*, either serologically or from bacteriological examination of the semen. It cannot be concluded that Merinos in New South Wales are not infected but it is reasonable to assume that the disease is not prevalent in the leading Merino studs. The position is less satisfactory in studs of British breeds.

The Director of Veterinary Research visited Adelaide in October, 1955, for consultation with South Australian workers on this problem.

Toxaemic Jaundice (Chronic Copper Poisoning and Helio-trope Poisoning).—Outbreaks of both occurred in the recognised districts amongst crossbred sheep. The number of outbreaks was normal.

In the case of chronic copper poisoning some owners have resorted to administration of sodium sulphate as a lick or a drench. On one property on the central tablelands, the provision of lucerne has almost eliminated losses caused by chronic copper poisoning. The lucerne operates by the combined effect of its potassium sulphate content, reducing the molybdenum level in the tissues and concurrently reducing copper which is voided in the urine. Lucerne also exerts a diuretic effect on sheep, almost doubling the urine output.

The Toxaemic Jaundice Joint Committee completed the paper on research at the Barooga Station. It has been accepted for publication and will appear at an early date. The Committee met once this year and now consider that their investigatory function has concluded and that it is unlikely to be necessary to meet for some time.

Investigation of the plant Paterson's Curse (*Echium plantaginaceum*) has failed to reveal the presence of any hepatotoxic alkaloids.

Listeriosis.—It would seem that infection of sheep with *Listeria monocytogenes* is more prevalent in New South Wales than was recognised formerly. The condition has been confirmed on six occasions, twice in the encephalitic form and four times from reproductive organs. It was suspected on three other occasions and one of these was subsequently confirmed by recovery of the organism from further material.

In the occurrences where ewes' reproductive organs were involved there was usually a high neo-natal mortality rate in lambs. The organism has not been recovered from neo-natal mortality cases *per se* and the two forms of the disease have never been encountered simultaneously on the same property.

The disease has occurred only in sheep. Studies on the bacteriology of the strains recovered are in progress. The organism has a high rate of infectivity for man, producing a usually fatal encephalitis.

Copper-Molybdenum-Sulphate Interaction in Sheep.—Analytical research on methods for the determination of sulphate in blood and plant material has indicated that the precipitation technique with barium sulphate is not entirely satisfactory. Removal of protein material by activated charcoal was an improvement on precipitation by ferric hydroxide, but the absorption of sulphate ions on the protein-charcoal complex interferes with estimation of low level sulphate. The standardisation of this technique is important for suspected ovine hypocuprosis.

Ovine Pregnancy Toxaemia.—Active work on this project has been in suspense following the departure of Mr. Setchell to Cambridge where, at the Institute of Animal Pathology, he is extending his research on the hypothesis that the condition is a hypoglycaemic encephalopathy.

L. Thyroxine and Wool Growth.—The New Zealand observation that *L. thyroxine* stimulates wool growth is being investigated here. Administered to sheep subcutaneously in dose rates up to 4 mgm. per day it induced a marked loss in body weight. There was considerable variation in body temperature, pulse and respiration rates. Work is in progress to determine the rate of absorption of *L. thyroxine*.

VETERINARY RESEARCH—POULTRY.

Pullorum Disease.—The long range project to determine the efficacy of the compound furazolidone in the control of pullorum disease continued. The investigation has been resolved into two studies:—(i) The effect of treating "carrier" hens, e.g., the elimination of the infection from the ovaries of the adult hen, and (ii) the effect of furazolidone on pullorum infection in chickens hatched from pullorum infected eggs.

(i) Eighty-eight "carrier" hens over two years of age were subjected to a course of treatment with the compound, but without any success.

(ii) By the treatment of chickens hatched from pullorum infected eggs, a highly satisfactory response was obtained.

The experiment is still in progress, to determine whether all foci of pullorum infection are sterilised as a result of the treatment of infected chickens, and to study the effect of pullorum infection in pullets in terms of egg production.

Coligranulomatosis.—This has been recorded on rare occasions in this State, in isolated individual birds. A severe outbreak amongst a large commercial flock in the Tamworth district was responsible for heavy mortality. At present there is lack of knowledge on any line of successful treatment, and an experiment is in progress to determine the value of various antibiotics in experimentally infected birds.

Coccidiosis.—This is one of the greatest causes of economic loss in the poultry industry. The volume of diagnostic material received from the field emphasises the extraordinarily high incidence of it in the poultry flocks of this State.

Because of unsatisfactory field results with some of the anti-coccidial drugs used by producers, an experiment was undertaken to compare sulphaquinoxaline, nitrafurazone, and nicarbazin, against caecal and intestinal coccidiosis under field conditions. The most effective preparation as determined by mortality rate of chickens was sulphaquinoxaline, closely followed by nicarbazin, with nitrafurazone giving very poor results. There was scarcely significant difference between the latter and no treatment. The highest growth rate occurred in the nicarbazin group.

Sinusitis in Ducks.—What appears to be the first recorded occurrence of sinusitis in ducks was encountered. Close scrutiny of the world's literature suggests that the condition has not been recorded previously. Two outbreaks were encountered this year, in Indian Runners and Khaki Campbells. The condition, non-lethal, is caused by infection of the head sinuses with organisms of the pasteurilla group. Intramuscular injection of streptomycin yielded a response.

VETERINARY RESEARCH—PIGS.

Leptospirosis in Swine.—Most of the serological work with swine has been carried out for diagnostic purposes—some 107 sera from thirty properties have been examined during the year. Of sixteen properties with a history of swine abortion and/or neo-natal losses, sera from pigs on thirteen properties revealed serological evidence of leptospiral infection. The opportunity to confirm this diagnosis by demonstrating the organism in foetal tissue did not occur.

Parakeratosis in Pigs.—This, described in the United States and claimed to be the effect of a deficiency of zinc in the diet, was suspected on a commercial piggery in the County of Cumberland.

An experiment was undertaken, with four groups of pigs under pen conditions and rations adjusted to various levels of calcium and phosphorus, to block zinc assimilation. The disease was not reproduced, but the experiment indicated that dietary levels of calcium and phosphorus permit considerable latitude without significantly impairing the growth rate of the pig.

RABBIT MYXOMATOSIS.

Myxomatosis continued to maintain satisfactory virulence in the sparse rabbit population of the State and at the close of the year the rabbit population was undoubtedly at an all-time low. There are still a few places where rabbits can be seen

in reasonable numbers, e.g., above the 4,000-ft. altitude of the Australian Alps, and parts of the Wilcannia District and at Broken Hill.

The moist summer provided very favourable conditions for mosquito breeding, significantly helping in the spread of infection. The disease was seen in rabbits even where the population was sparse, and high grade kills occurred.

The so-called "Glenfield" strain of the virus has been maintained at full virulence, and supplies of virus have been available to Pastures Protection Boards and stock owners throughout the year; 188,000 doses of virus were sent out on request, as against some 280,000 in the previous year. As expected the demand decreased, many districts being free of rabbits.

On one property in the West Darling country where rabbit numbers had increased during the spring, a fresh introduction of "Glenfield" virus resulted in a high grade kill during the summer. Results of this type offer hope that efficacy of the infection as a lethal factor for rabbits might be expected for the next few years. It is evident that attenuation is taking place in the field, a strain having been recovered with low killing power, up to twenty-nine days, and a fairly high rate of recovery with subsequent resistance to infection with virulent strains.

Rabbit skin sales in Sydney again showed a marked decline in tonnage, 376 tons as against 700 tons for the previous year. Prior to the myxomatosis era the mean tonnage of rabbit skins sold in Sydney was 3,000 tons.

It is now ninety-seven years since James Austin introduced the original twelve pairs of rabbits to Australia, where they were liberated at Geelong. Six years later he destroyed 25,000 and assessed that another 10,000 had escaped.

Every endeavour should be made to maintain the existing favourable position. Never has there been a greater need for every possible anti-rabbit measure or power to be exercised by Pastures Protection Boards and property owners to destroy the residual population.

Nutrition Research from Glenfield Laboratory.

Concentrate Feeding of Dairy Cows.—At the Macquarie Fields dairy over the summer and autumn months the relative values of high and low meal feeding of dairy cows grazing native pastures were examined.

The high rate group receive a concentrate meal at the rate of 4 lb. per gallon per day and the low rate group 2 lb. per gallon per day. The difference in production was 5 per cent. in favour of the high rate group and was probably not significant. The high rate group consumed 112 per cent. more concentrates than those in the lower rate of feeding. This was uneconomic.

The monetary difference in the quantities of milk produced was £12 whereas at current prices the difference in the quantities of meal consumed was £52. Under the climatic conditions in the County of Cumberland last summer concentrate feeding was highly uneconomic.

Protein Levels in Dairy Meal.—During the winter of 1955 two groups of cows in the Macquarie Field herd were fed dairy meals:—(i) with a high crude protein content, 20 per cent.; and (ii) with a low crude protein content, 12 per cent. No difference was apparent in milk production between the two groups over the winter period.

Calf Rearing.—A calf-rearing experiment at Macquarie Fields, on the value of dried dairy products, alone or incorporated in meals, as substitutes for fresh whole milk, has indicated that the dried dairy products are very satisfactory and economical.

Drought Feeding Research in Sheep.—The drought-feeding projects in the Burdekin Unit at this Station in co-operation with the C.S.I.R.O. Division of Animal Health and Production have continued.

An experiment was concluded which provided further confirmatory data that Vitamin A given to sheep as one massive dose is absorbed and utilized with equal efficiency when the vitamin is in the form of the oil, the emulsion, or the water miscible suspension.

In a further experiment on utilisation of low quality roughage by two-tooth Merino wethers, the addition of 4 oz. of concentrate to *ad lib* low quality roughage improved body weight performance, wool production, roughage consumption, and survival rate.

This year the low quality roughage was oaten straw containing 3.4 per cent. crude protein. The supplements, fed twice weekly to groups of twenty wethers, each treatment replicated, comprised an average daily protein intake and an

average daily energy intake. The experiment was to extend over six months but exceptionally heavy rain late in January, and in February, caused heavy losses and forced the termination of the experiment after twelve months. The results for the short period suggested that provision of nitrogen during the feeding of low quality roughage is of greater importance in the maintenance of body weight than in the provision of energy.

During April-May, 1955 and subsequently from November, 1955 to the end of June, 1956, continuous heavy rain was experienced at Glenfield. In February and March, rain was recorded on nineteen and seventeen days respectively with totals of 1927 and 917 points. During the wet periods, heavy infestations of *Strongyloides papillosus* and *Trichostrongylus* spp. developed in the sheep in the Unit and necessitated temporary abandonment of the experiments.

Attempts to control the parasitism using gentian violet, piperazine hydrate, tetrachlorethylene, phenothiazine, and hexachlorethane, did not yield favourable results.

An attempt was made to destroy *Strongyloides* larvae on the ground by spraying the ground with kero at weekly and fortnightly intervals but the continuance of unfavourable weather and recurring rainstorms has rendered evaluation of the treatment difficult.

Determination of Vitamin A in Concentrates.—A reliable, accurate method is required for determination of vitamin A content of concentrates. Some proprietary concentrates have been examined for vitamin A concentration by spectrophotometric methods. Simultaneous biological assays have revealed a very good correlation.

Silage Investigations.—In conjunction with the investigations at Wollongbar Experiment Farm, methods to determine the volatile fatty acids of silage are being studied. Results to date indicate that determination by fractional distillation presents considerable difficulty. Standardisation of equipment is essential, together with redetermination of distillation constants.

Poultry Nutrition Research.

Low Protein Meatmeals.—It has been established that hens fed low protein meatmeals do not lay as heavily as hens fed high protein meatmeals, even though the diets contain the same quantity of total protein. The difference, which is not prevented by a vitamin D3 supplement, is greatest during the winter.

Chicken Experiments.—The superiority of high protein meatmeals for chickens has been confirmed. Energy levels of the mash did not modify the difference. Supplements of methionine and glycine did not prevent growth depression by low protein meatmeal. Growth depression was not prevented by feeding low protein at above normal levels to provide more digestible protein. These experiments are continuing.

Vitamin D and Winter Egg Production.—During the winter of 1955 a supplement of vitamin D3 increased egg production of White Leghorn pullets by approximately 10 per cent. This is being repeated, to examine the effect of housing systems.

Debeaking of Chickens.—Debeaking of chickens to control cannibalism is becoming a practice. An experiment last spring showed that provided no more than half the top beak was removed, the ability of the chicken to secure food and to grow were unimpaired.

Toxicology.

Toxicity of D.D.T. for Mammals.—Experiments with mice and calves were undertaken to ascertain the quantity present in certain body tissues, following feeding of D.D.T. at various levels, e.g., mgms. per kilogram per day.

In mice it was found that a level of 600 parts per million in the feed, equivalent to 135 mgms. per kilogram per day caused death in three weeks. At 300 p.p.m. or 62.5 mgm. per kg. per day some mice were killed but at rates of 31 mgms. per kg. per day or less the mice were not affected.

D.D.T. was fed to three calves. The first received 760 mgms. D.D.T. per day from two to eleven weeks of age, and the second the same amount daily from birth to eight weeks of age. This rate gave an initial dose rate of 22 mgms. per kg. per day, but as the calves grew the rate per kilogram body-weight decreased. The calves remained unaffected and grew at a normal rate.

The third calf was fed D.D.T. at the rate of 70 mgms. per kg. per day from birth. Signs of D.D.T. poisoning were evident on the eighth day and death occurred in the fifteenth day. On analysis the D.D.T. content of the liver was 270 mgms. per kg. and the kidney 180 mgms. per kg.

Toxic Plants.—Several suspected poisonous plants have been under investigation. Amongst these Lagoon Spurge (*Phyllanthus lacunarius*) was strongly suspected on field evidence but under pen-feeding trials with sheep failed to reveal any toxic property. Similarly the plant Nardoo (*Marsilea drummondii*) which has been suspected as toxic for sheep was tested by pen trial feeding, without any toxic effects.

These findings do not completely absolve the plants. Changes occur between their time of collection in the field and their receipt at the laboratory, and grazing trials with sheep in the environment in which the plant is growing eliminate some of the variables. The specialised habitat of the plant and its ecology could be important in the development and retention of toxic properties for stock.

A considerable number of plant introductions, notably legumes, are being examined at Grafton Experiment Farm by the Division of Plant Industry. Their examination for palatability and innocuity for stock is very important. Initially, guinea pigs have been sent to Grafton for the purpose. Some plants have proved fatal, and the pathological effects on important organs of the guinea pig are being examined at the Glenfield Veterinary Research Station.

Shannon Vale Nutrition Station.

The area of the Station remains at 600 acres of which 350 acres are sown to pastures. The mean, sheep population during the year was 1,400. A field day held in September, 1955, drew seventy-five people.

Over the year pastoral conditions have been difficult. Excellent grazing in the spring and up to the end of January was reflected in the condition of the sheep but from early February constant heavy rain had a most unfavourable effect on young sheep. Lambs in the fat lamb project did not progress at the usual rate.

The long range experiment designed to investigate the production from the seven days and three and a half days sown pasture grazing groups is still in progress, there now being some 260 sheep in each group. The performance of the filial generations under the two treatments will yield interesting information.

The differentially sown grass species plots are now being grazed by three groups of breeding ewes. Production data are being taken from each group, including the response of the pasture areas to the different treatments.

Pastures topdressed at rates of 1, 2 and 3 cwt. of superphosphate per acre are now being grazed. Data are being kept on the sheep-hours of grazing on each 5 acres, as measurements by pasture cuts under cage conditions have proved unsatisfactory.

Investigations are being continued on the value of natural grazing paddocks according to pasture species, composition, and the effect of deferment in obtaining optimum production from sown pasture.

The fat lamb investigations using the Southdown sires on the Romney Marsh have now been extended by the inclusion of twenty-five Cheviot-Romney ewes.

Paddock No. 9 sown to pasture in 1940 has now been resown after fifteen years, a small portion of the original area being retained for comparative observation with the resown area.

The advice of officers of the W.C. & I.C. has been sought in the provision of improved water storage facilities on the Station. Owing to the granitic texture of the country the W.C. & I.C. considered that only one site would hold water satisfactorily. Plans and specifications were prepared, tenders were called and are now under consideration.

Wool Research Laboratory—Trangie Agricultural Experiment Station.

Mr. R. B. Dun, B.V.Sc., has acted as Officer-in-Charge since Dr. Morley resigned, but has been granted two years post-graduate study leave at the University of Sydney in the Department of Genetics. The responsibility of acting as Officer-in-Charge has now been undertaken by Mr. A. J. Marrant. The assistant Wool Technician, Mr. J. B. Walker, resigned in June to take an appointment as Field Survey Officer under the Grasshopper Control Committee.

Excellent seasonal conditions prevailed from June, 1955, to January, 1956. Since February 32 inches of rain have been recorded, and a severe flood in March extensively damaged the pastures. The constant rain has provided favourable conditions for foot rot and intestinal parasitism.

Breeding Experiments.—In the light of the results to 1955, the design of these experiments has been modified. The so-called "Index Flock" is now designated the Selection Demonstration Flock (S.D.). The aim with this flock is, by fleece measurements to breed a high producing, medium woolled, polled Merino. Clean fleece weight is the principal selection factor, with a degree of culling for excess skin folds, low crimps per inch, and heavy face cover.

In 1955 it was necessary for various reasons to advance the date of shearing. This influenced the wool data for 1955 rather unfavourably, the fleeces representing approximately only ten and a half months' growth. Once again the Selection Demonstration Flock produced more clean wool per head than the Stud, owing to the higher yield and longer staple, in spite of the greater fold development in the Stud. The polled gene was introduced into the Selection Demonstration Flock in 1953 by three polled rams each of which proved subsequently to be heterozygous, half the progeny being polled and the other half horned. Preliminary figures indicate that polling is not strongly associated with economic characters.

Conditions were ideal for the spring mating, in which 700 ewes were paddock mated and 600 by artificial insemination. Of the ewes mated 85.2 per cent. lambed, with a lambing percentage of 95.6. Between lambing and marking 9.6 per cent. of lambs succumbed.

Co-operative Grazing Trial.—The paper recording the results of this experiment since 1948 was completed and has been accepted for publication. The Technical Committee directing this work had planned to investigate another aspect of a management system for sheep in this environment but has now recommended to the signatories to the Memorandum of Agreement, the Department of Agriculture and C.S.I.R.O., the abandonment of this type of experiment work at Trangie.

Sheep Nutrition Experiments.—The experiment with ewe weaners which commenced in June, 1953, to study the effect of early nutrition on subsequent growth, body size, wool production, and fertility, has been continued. One group was on a high and the second on a low plane of nutrition for twelve months, and then mated and placed on same plane of nutrition. The results this year show that if current relative rates of body weight increase are maintained, the low plane group should attain the weights of the high plane group in four years.

The high plane group had 13.5 per cent. higher lambing rate than the low plane group, with 14.5 per cent. twins in the high group and 4.3 per cent. in the low, and significant differences in conception rates in favour of the high group. Wool production after twelve months on the different planes of nutrition revealed the high plane group had heavier greasy and clean fleece weights of 3.5 lb. and 2.4 lb. respectively. This difference had decreased considerably in the second year.

Other results recorded were that a low plane of nutrition from six to eighteen months of age had little effect on skeletal development. Any effects on muscular development were adjusted by a high plane of nutrition from eighteen months onward.

At lactation the high plane ewes yielded 3 oz. per day more milk than the low plane with, by 2.5 lb., a heavier weaning weight lamb. The eruption of the permanent incisor teeth was slower in the low plane group. In both groups the effects of pregnancy advanced the stage of dental development. At two and a half years of age the dentition of individual ewes in both groups varied from 2 tooth to 6 tooth.

Sheep Classing.—From district graziers' flocks some interesting information has emerged, from the systems of classing on the basis of greasy fleece weight and clean fleece weight. The half classing system gave good results, being only 16 per cent. less in progress, in clean fleece weight, than by selection solely on a greasy weight basis. There were improvements in the wool quality and wool fineness as measured in crimps per inch.

Blowfly Control at Lamb Marking.—At the spring lamb marking an experiment was undertaken to compare the relative efficiency of dieldrin and diazinon as fly repellants. The compounds were applied by immersion after docking. There did not appear to be any marked difference between either group in the incidence of breech strike up to ten weeks. The diazinon group remained free from tail strike. The experiment is to be repeated in the spring of 1956 using a different technique in applying the repellants.

Wollongbar Experiment Farm.

Some progress has been made in collaboration with the Division of Plant Industry on the pasture programme for Wollongbar, but some items remain to be determined. Several projects with pigs and dairy cattle are in progress.

1. The investigation of Vitamin A plus meal, as a substitute for green feed for pigs, did not reveal any significant difference between the groups; indicating that the former is a satisfactory substitute for greenfeed.

2. The cows fed concentrates, in addition to grazing summer and autumn kikuyu pastures, gave a totally uneconomic increase in production.

3. The early weaning-late weaning of calves experiment is still in progress. The response varies according to the time of the year at which the calves are born.

4. Another calf rearing experiment was commenced. This aims to compare the value, if any, of skim milk feeding after colostrum feeding with normal calf rearing on whole milk then skim milk for 6-7 weeks.

5. An experiment was designed to examine the effect of high temperatures on milk production. Owing to the mild, wet summer the necessary heat factor was absent.

6. The palatability of silage is being investigated on the Wollongbar stock, and is complimentary to the Glenfield laboratory work in assessing the fatty acid content of silage of various compositions.

Poultry Experiment Station, Seven Hills.

The position for a second livestock research officer remained unfilled, through difficulty of attracting suitable applicants. Mr. M. W. McDonald, B.Sc. Agr., livestock research officer, has been granted permission to undertake post-graduate studies under the aegis of the Faculty of Agriculture, University of Sydney. His project embraces some of the current work at Seven Hills, where he will continue to spend a major part of his time.

Breeding Improvement Plan—Recurrent Reciprocal Selection.—As a result of one further selection this year, the project has progressed to an average improvement of fourteen eggs per selection. The imported White Leghorn birds from the United States of America have exerted a considerable influence. They possess a high level of combining ability with both Australorps and Australian White Leghorns. The programme during the coming year is being modified to multiply selected Australorp lines, to produce sufficient pullets for a further line of selection.

Breed Differences in Nutrient Requirements.—A major difference in the requirements of White Leghorn and Australorp chickens for methionine has been identified and confirmed. The requirements of the reciprocal crosses are not known conclusively but it appears that a single sex linked factor is responsible. Further studies are in progress to establish whether the requirement differences are due to more rapid feathering of White Leghorns.

Beef Cattle, Horses and Goats Section.

STUD STOCK FROM OVERSEAS.

The principal livestock officer was a member of the 1956 Stud Stock Buying Delegation which visited the Continent, the United Kingdom, Eire, United States of America and Canada. The delegation purchased dairy and beef cattle and an Arab stallion.

The beef cattle purchased were an Aberdeen Angus bull, Pro Ben of Balfon, from Scotland; a Poll Shorthorn bull, Birmingham Nugget 3rd from Canada; a Poll Shorthorn bull, R.B. Collynie Supreme, and six females, from United States of America. All of these animals, except one female from United States of America which failed to show in calf, have now arrived in Australia.

The Arab stallion, Razaz, purchased in England, was exhibited at the 1956 Royal Agricultural Society Show, Sydney, and gained the award of Champion Arab Stallion.

Representations.—The principal livestock officer is the Departmental representative in the following bodies:

Commonwealth Clydesdale Horse Society.

Arab Horse Society of Australia.

Aberdeen Angus Society of Australia.

Poll Shorthorn Society of Australasia.

Goat Breeders Society of Australia.

Technical sub-Committee on Beef Cattle Production.

BEEF CATTLE.

Beef Cattle Studs.—The recently established Poll Shorthorn stud at Wagga Agricultural College has been augmented by the importation of two bulls, and five females, one with a bull calf at foot, from Canada and United States of America. The stud made its debut at the 1956 Royal Agricultural Society Show, Sydney, and achieved highest honours by gaining the Supreme Championship of the breed with a heifer bred at the College. A young bull bred at the College, although it did not win a prize, was sold for 425 guineas.

The Aberdeen Angus stud at Trangie Experiment Station profited by the importation of a bull from Scotland. There has been a firm demand for young stud bulls, and all available for sale have been cleared at good prices of up to 350 guineas. The stud gained the Supreme Championship at the 1956 Royal Agricultural Society Show, with a bull of its own breeding, for the second successive year.

The small Aberdeen Angus stud at Hawkesbury Agricultural College has not undergone any marked change but it is serving its purpose as a demonstration unit for the students.

The stud at Grafton Experiment Farm, of one breeding unit, is being used as a testing unit for bulls bred at the Trangie stud.

The stud established at Wollongbar Experiment Farm (Duck Creek) is used primarily to breed weaners for investigational work at Leeton Experiment Farm. This stud is being built up to 100-120 females with surplus females from the other Aberdeen Angus studs. Mainly as a result of this objective, the total of Aberdeen Angus cattle in the Department's studs has risen from 263 to 303 head in the year under review.

Commercial Beef Cattle.—These are made up of cattle used for investigations at Leeton Experiment Farm, ration cattle for the Agricultural Colleges, a grade breeding herd which is being changed over to a stud herd at Duck Creek, and the cattle herd, mostly dairy cattle, at Glenfield Veterinary Research Station.

One Poll Shorthorn steer from Wagga Agricultural College was exhibited at the 1956 Royal Agricultural Society Show. Placed Second in its Class, it brought the next highest price to the Champion steer when sold by auction.

Two Aberdeen Angus steers exhibited by Trangie Agricultural Experiment Station at the 1956 Fat Stock and Carcase Show and Sales gained First and Third prizes on the hoof and Second and First prizes respectively on the hook.

Beef Cattle Breeders Competition.—Sponsored by the Agricultural Bureau of New South Wales and the Rural Bank, this competition was conducted for the fourth successive year. The Department supplied eight of the ten district judges, and the State judge. The competition has more than held its appeal to beef cattle raisers, and attracted 151 entries in 1955-56. It has been an excellent medium for beef cattle extension work, as field days held in conjunction with judgments are well attended.

Beef Cattle Carcase Competitions.—Competitions were held at four country abattoirs, viz.:

Wagga, twenty-three entries judged, each of three carcasses;
Goulburn, eleven entries judged, each of three carcasses;
Macksville, twelve entries judged, each of three carcasses;
Casino, thirty-four entries judged, each of three carcasses
(these were in two classes, one of twenty-two entries and the other of twelve entries).

A similar competition planned for Dubbo Abattoir was abandoned because of floods. These competitions served a good purpose as extension media.

Beef Cattle for New Guinea.—The Chief, Division of Animal Industry, New Guinea Department of Agriculture, on a tour of New South Wales Poll Shorthorn and Aberdeen Angus studs, was assisted in his selection of young bulls for export to New Guinea.

Beef Cattle Feeding Research.—At Leeton Experiment Farm the fifth group of forty-six weaners has arrived from Duck Creek. The liveweight increase continues to show a seasonal pattern, with daily gains from 1½ to 3 lb. during the September-November period and a somewhat lower peak during February-March. The poorest daily gains are during the June-August period and in December.

In the first twelve months on irrigated pasture the average gain has been 1.43 lb. per day; steers showed a gain of 0.17 lb. per day more than heifers.

At "Belabula Farms", Canowindra, the second season of weight recording has confirmed that very satisfactory liveweight increase can be achieved off pasture plus second quality

lucerne hay fed *ad lib.* Two groups of weaner steers made daily gains of 1.72-1.75 lb. in 1954 and 1.33-1.37 lb. in 1955 over six to eight month periods.

Two other groups of steers were yard fed for 140 days during the winter. The one provided with second quality lucerne hay plus 3 lb. of kubettes made comparable gains to the grazing stock.

The group fed hay alone, although gaining at a slower rate during the yard-feeding period, made faster gains during the subsequent period on spring grass than their fellows not so retarded.

"Improvement of Breeding Stock"—Demonstration Project.—An "Improvement of Breeding Stock" project has been drawn up for Agricultural Extension Grant demonstrations. Two demonstrations have been initiated in the Bombala district on the southern tablelands. A portable cattle weighing machine has been procured from a Queensland firm, to make possible the weighing of stock on a number of different properties.

This project is based on the selection of cows on the relative merits of their calves at weaning. Both weight and quality of calf are considered. It is necessary to correct or adjust the weight of each calf to what it would have been if the calf had been: (a) a steer, (b) reared by a mature cow, (c) weaned at a constant age.

Analysis of data from the 285 calves on the two properties has shown that on the average: (a) heifers are 26 lb. lighter than steers at weaning, and (b) calves from 3 year-old and 4 year-old cows are 57 and 25 lb. lighter respectively than calves from mature cows.

Adjustments have been made to the weaning weight of calves in the current drop and recommendations made for the culling of poor-producing cows.

The date of calving will be recorded in the coming year. This will enable a more accurate adjustment to be made for the age of the calf at weaning, as required in the aforementioned (c).

Records of the growth and development of calves on pasture at twelve and eighteen months of age will shortly be available. It will be possible at that stage to assess further the relative merits of the sires.

The full results of the demonstration will only be seen after a number of years, when the accumulation of a mass of factual information will be invaluable for extension work throughout the State.

HORSES.

Arab Studs.—An Arab stallion was imported from England in January, 1956. Arab horse breeding is now restricted to Wagga and Hawkesbury Agricultural Colleges. At Hawkesbury a new area, with required fittings, has been set aside.

At the 1956 Royal Agricultural Society Show, Sydney, the Department's Arab horse exhibits won every class and took the stallion and mare Championships.

A keen demand continues to exist for colts bred by the Department. All available colts have been sold at prices up to 250 guineas, and a long waiting list exists for surplus females. The demand for services of Departmental Arab stallions for privately-owned mares is so heavy that applications are being declined for the 1956 breeding season. A total of seventy-three privately owned mares was served by the Department's stallions at the breeding centres. This compares with fifty-two in 1953-54 and thirty-nine in 1954-55.

Clydesdale Studs.—Clydesdale breeding as from this year is being confined to Hawkesbury Agricultural College, and the small breeding group at Trangie Agricultural Experiment Station has recently been transferred to Hawkesbury. Inquiry for Clydesdale colts is spasmodic.

GOATS.

Saanen and Toggenburg Studs.—The goat numbers at Condo-bolin Experiment Farm remained almost stationary. Sales of stud goats, males and females, have stepped up considerably. The Department accepted twenty privately-owned does for service by its bucks during the year. At the 1956 Royal Agricultural Society Show the Department's animals gained two female Championships and won half the prizes in the goat section.

Goat Herd-Recording.—In the herd recording, one Saanen doe produced over 4,000 lb. milk in a lactation period of less than twelve months.

Accommodation and facilities remain a problem at Condo-bolin and the project is hampered by those limitations.

Apiculture Section.

Improved Staff Position.—The apicultural staff position has improved considerably in recent years. There are now five permanent officers, all Diplomates in Agriculture, Hawkesbury or Wagga.

The livestock officer (apiculture) assisting the principal livestock officer (apiculture) at head office is destined for transfer to the central west districts with headquarters at Orange. The officer transferred from the central west now has headquarters at Tamworth, and provides an extension and inspection service to beekeepers in northern districts. From Wagga headquarters an officer carried out apiary inspection and extension work in the southern districts, as well as attending to the Wagga College Apiary and the lectures in apiculture at that College.

Industry Position.—The season was difficult for apiarists generally. The excessive late summer and autumn rains washed nectar from blossoms, shortened flowering periods, and restricted activities of the bees. Water-logged paddocks and damage to by-roads made difficult the movement of hives from one locality to another. Excellent prospects for satisfactory honey crops were evident in many districts, but yields were far below expectations. Because of low production there is a particularly strong demand for honey. The local price has recently increased. Overseas the demand is very great.

Bee Diseases.—Prompt, effective action by apiary inspectors, honorary apiary inspectors, and apiarists prevented outbreaks of American foul brood disease reaching serious proportions. In many important honey producing centres outbreaks or suspected outbreaks were reported, inspections were made and early control measures brought into effect.

There has been a considerable reduction in the incidence of brood disease in bees compared with 1954. The following comparisons, of payments made to beekeepers for Bee Diseases Compensation are illustrative:—

1954.	1955.	1956.
£1,151 19s. 10d.	£421 12s. 8d.	£246 6s. 8d.

Nosema disease was favoured by the wet season. Many thousands of hives were seriously reduced in numbers by it. It took greatest toll in the north and central west where there was prolific flowering of white box (*Eucalyptus albens*) and mugga iron bark (*Eucalyptus sideroxylon*). Many hives died whilst working these winter flowering species.

Overseas, an anti-biotic has been produced for the control of nosema disease. Supplies of the anti-biotic, Fumidil B, were received from U.S.A. and a trial was inaugurated at Hawkesbury Agricultural College. Unfortunately the major flooding of the Hawkesbury River in February destroyed the River Farm Apiary before the trial was completed. Additional Fumidil B has been obtained from overseas, and further trials will be undertaken at Hawkesbury College and the Tamworth Experiment Station in the coming season.

Apiaries Act, 1916-44.—Departmental officers inspected apiaries to ensure that beekeepers are complying with the requirements of the Apiaries Act.

Departmental Apiaries.—Departmental apiaries are being improved. Further equipment has been received and installed at Bathurst Experiment Farm. Improvements to the apiary and buildings at Wagga Agricultural College and Bathurst Experiment Farm have been planned. A small apiary has been established at Tamworth Experiment Station, to facilitate trials relative to nosema disease, pollens, and special problems associated with white box (*Eucalyptus albens*).

Queen Breeding.—Despite the difficult season at Hawkesbury College the apicultural officer made further progress in the queen breeding programme. A considerable number of queen bees were made available to apiarists, from Hawkesbury Agricultural College. Specially prepared nucleus colonies were sent overseas for breeding purposes.

Summer School of Apiculture.—This was held at Hawkesbury Agricultural College during January, 1956. Beekeepers recognise the value of these Schools. This was evident by the full complement wishing to attend and the fact that sons of former students also attended.

Extension Services.—Apiary officers contacted as many beekeepers as possible and gave valuable assistance wherever practicable. They were also active in the preparation of photographic material for use in extension work. A wide range has been covered in preparation of material for Departmental publications, and photos were made available to Departments and journals in other States. Talks at meetings in country centres were illustrated with 35 mm. kodachrome slides.

The principal livestock officer (apiculture) visited most of the important honey producing centres and addressed beekeepers at general meetings of their local associations.

Bee Handling and Honey Extracting Demonstrations.—Departmental officers again played a prominent part in arranging and conducting these at the Sydney Royal Show. The demonstrations were held ten times daily and well received by the public. The exhibit was jointly arranged by the Royal Agricultural Society of New South Wales, the Commercial Apiarists' Association of New South Wales, and this Department.

Statistics of the Apicultural Services.—

	1954-55.	1955-56.
Lectures and Demonstrations	40	68
General Inspection of Apiaries ...	850	1,020
Apiaries Infested with Wax Moth ..	29	40
Apiaries Infested with Brood Disease	28	15
Notices for Adjustment of Hives ..	46	57
Certificates Issued for Inter-State Trade in Honey	70	188
Quantity of Honey Exported to Queensland	656,280 lb.	2,063,740 lb.
Beekeepers Registered	3,902	3,853
Protected Apiaries Registered ...	74	53
Apiary registration fees collected...	£2,712 13s. 10d.	£2,706 16s. 8d.

Poultry Section.

Production Trends.—Egg production declined by approximately 7 per cent. compared with 1954-55, because smaller producers have been accepting employment in other industries. There is a marked tendency for well-established egg producers to undertake increased flocks, by adopting modern labour saving methods, and for others to keep poultry as a sideline.

Broiler Production.—Practically all available cockerels, except for a very short period, were raised for market; and a number of producers are specialising in it.

The N.S.W. Poultry Improvement Plan (Eggs).—The principal livestock officer (poultry) attended a conference of Commonwealth and State officers at Melbourne during August, 1955, when details were finalised for the implementation of a uniform "Poultry Improvement Plan (Eggs)" for all States. The N.S.W. Plan was amended to conform, and has been accepted by all industry Associations. The principles of breeding outlined in the Plan are being adopted already by fifteen private breeders in this State.

The degree of improvement as a result of family selection will be measured by Random Sample Testing. Increased equipment for the testing of approved breeder stock is nearing completion at Hawkesbury Agricultural College.

Demonstration Projects—Agricultural Extension Grant.—Three Demonstration Projects are in progress in the Tamworth-Kootingal area, as follow:—

- (1) Housing layers in cages, to demonstrate the high food utilisation and better production obtained by this method.
- (2) Intensive housing in small flock units, to demonstrate better egg yields through improved environment.
- (3) Free choice feeding, providing a high protein mash supplement in addition to wheat.

Each demonstration has progressed satisfactorily and aroused producers' interest.

Breeding demonstrations have been approved, for location on private farms in the near metropolitan area, adapted for testing different breeding lines in the leading commercial breeds—White Leghorns, Australorps, Rhode Island Reds, Langshans.

Extension Services.—Regular monthly contributions were made to the *Agricultural Gazette of New South Wales*, from which they were reprinted as *Poultry Notes* and sent direct to 6,500 poultry farmers.

Extension leaflets on various phases of poultry husbandry are available and have been regularly revised to meet developments.

The services of three field officers, one working from head office, one from Parramatta and one from Tamworth have given rise to the following statistics:—

Visits to private farms	905
Number of stock culled	40,000
Number of breeders selected	4,500
Visits to Government Institutions	22

Lectures given	16
Field days conducted	13
Visits to Departmental Farms	25
Judging at Shows	4
Chick Sexing Examination	1
Poultry Schools held	2

Poultry and Turkey Raising Schools.—Short-term Schools in Poultry and Turkey Raising were held, at Hawkesbury and Wagga Agricultural Colleges respectively. Each school was well attended. The Turkey Raisers School attracted farmers from all States.

Piggery Section.

Industry Trend.—As forecast last year, a shortage of pigs developed and pig prices increased under competitive buying. In the last six months it was evident that farmers were being re-attracted to pig-raising. There has been increased demand for the services of livestock officers (pig) in planning pig-raising projects and providing information relative to general management.

Departmental Pig Studs.—The pig herds at Yanco, Temora and Glen Innes Experiment Farms were dispersed during the year. Departmental pig-breeding is now concentrated in the herds at Hawkesbury and Wagga Agricultural Colleges and at Wollongbar and Grafton Experiment Farms. At Wollongbar and Grafton Farms programmes of research were fulfilled.

The reduction in Departmental stud-breeding is reflected in the following comparative figures:—

	1953/54.	1954/55.	1955/56.
Stud pigs sold	410	184	151
Market pigs sold	277	528	586
Pigs killed for food	350	367	425
Approximate value	£18,000	£13,000	£17,000

Show Teams.—Teams of stud pigs were exhibited by the Department at the Royal, Sydney, and at country Agricultural Shows, with success; and award-winning entries were also made in Bacon Pig Carcase Competitions.

Swine Branding Act.—The Swine Branding Act, 1940, brought into operation on 1st July, 1955, was administered successfully. Approximately 2,500 properties were identified as farms of origin of diseased carcasses. Remedial steps to deal with the cases of heavy tubercular infection were taken, as far as the staff position allowed. The implementation of the Act has been partly responsible for a marked improvement in the financial position of the Swine Compensation Fund, and this trend may become more marked as registered pig-branding becomes more firmly established. There is no doubt that implementation of the Act will reduce losses of pigs from disease.

Extension and Regulatory Services.—An indication of ways in which livestock officers (pig) have assisted farmers, and the pig-raising industry in general, is in the tabulation:—

	1953/54.	1954/55.	1955/56.
Farms visited	1,197	1,152	1,135
Meetings attended	74	76	48
Pig sales attended	80	68	75
Field days attended	33	32	35
Bacon factories, visits ...	39	49	66
Experiment Farms, visits ..	95	93	86
Shows attended	30	25	29
Lectures and demonstrations given	74	64	39
Stock Foods Act Inspections	5	12	2
Broadcasts	17	39	43

In addition, many inquiries in person, by correspondence, and by telephone were met. Specialist advice was also provided to other Divisions' officers, in the Co-ordinated Extension Service Scheme.

Technical assistance was given to the Departments of Prisons, Health, Education and Child Welfare, also to Agricultural Show Societies, the Agricultural Bureau, various farmer organisations, the Junior Farmers' Club Movement, Pig Clubs, and the Australian Pig Society.

Special attention was also given to the improvement of marketing methods. A grant of £500 from the Commonwealth Agricultural Extension Grant was arranged, to assist the New South Wales Branch of the Australian Pig Society in operating a scheme for marketing bacon pigs on a weight-and-grade basis.

Sheep and Wool Section.

The establishment strength of the section, twenty-six officers, has been filled, and two districts, Deniliquin and West Wyalong, which had been vacant for twelve months or more were staffed in January. Headquarters of the Deniliquin district was changed to Berrigan for effective coverage of the more populous portion of the district. There are thirteen district officers in operation.

The run of above average seasons has resulted in a very high build-up of parasitic infestation in many areas. The continued wet, humid conditions during the late summer, and autumn, resulted in widespread heavy worm infestation. Unaccustomed areas experienced heavy infestations necessitating continuous treatment.

Extensive warnings were given by radio, press, and other extension media, but many owners did not fulfil preventative and curative measures necessary to prevent mortalities.

Considerable sheep losses through the floods have been not so much from actual drownings as from isolation on confined areas of high ground, consequent inaccessability, and difficulty in feeding them and carrying out other necessary management and husbandry operations.

The difficulties of sheep property management were accentuated by an industrial dispute in the shearing industry which seriously delayed shearing in many districts to the detriment of the wool clip and sheep husbandry.

The 1955 spring lambing was exceptionally good. High percentages were obtained, with above average survival rates. The 1956 autumn lambing yielded a lower than normal survival rate, almost entirely due to seasonal conditions.

Industry Trends.—Early, wool prices declined 10-12½ per cent., but firmed during the latter half of the selling season and the greatest increase occurred towards the end of the twelve months under review.

Considerable expenditure is still being incurred in pasture improvement, maintenance, plant, and erection of buildings, because of the relatively high level of rural incomes. Seasonal conditions have limited the amount of top dressing of pastures that could be undertaken; but adverse affect is not yet apparent.

There has this year being a decided swing towards lamb production and dual purpose breeding. The supply of suitable breeding stock, both rams and ewes, is still as acute as ever and the major limiting factor in the production of quality lambs; but many breeders of first-cross ewes are retaining the ewe portion of the drop for sale to lamb raisers. If this tendency expands it will go a long way towards the requisite number of desirable type ewes.

Regard for the Corriedale increased slightly, but the breed is unlikely to regain its former popularity unless strains that will bring breeding performance into line with the needs of the lamb-raising industry are developed.

Acute shortage of British breed rams has resulted in excessive prices for flock rams at auction. Such prices impose a high prime cost per lamb, contributing significantly to increased production costs.

Expansion of stud breeding has been encouraged, particularly of those breeds associated with lamb production, to counter possible detriment to the industry through use of inferior and half-bred rams.

The blowfly problem is now of minor importance, with more widespread acceptance of the Mules operation and jetting and spraying with the newer insecticides. It is hard to understand the tardiness of some sheep owners towards adoption of the new insecticides.

Foot troubles comprising footrot, foot abscess and scald have assumed major importance. Conditions have been extremely favourable to their development, with a cumulative effect from the run of above-average seasons. The problem of dealing with footrot has developed into a policy of containment; eradication is almost an impossibility under existing circumstances. Extension activities are being and will be directed towards creating in sheep owners an attitude which will be conducive to an eradication campaign when seasonal conditions return more closely to normal.

A further survey has indicated that the scourable branding fluids, L.B.E. formulation and SI-RO-MARK, are almost exclusively used. Some criticism has been levelled at SI-RO-MARK as being too thick in cold weather for efficient branding, but this defect is not reducing its acceptance by the industry. Sheep branding is becoming less general, particularly in closer settled areas.

Extension Work.—The time devoted by livestock officers to inquiries relating to the management aspects of sheep raising has markedly increased, particularly relating to nutrition and husbandry.

The work of the district livestock officers (sheep and wool) is summarised:—

	1954-55.	1955-56.
Number of properties visited ..	1,819	2,014
Sheep classed	354,307	332,832
Rams and ewes selected for breeders	4,062	7,316
Value of rams and ewes selected for breeders	£56,503	£91,520
Sheep selected for War Service Land Settlers	8,707	5,869
Value of sheep selected for War Service Land Settlers	£24,078	£23,091
Visits to War Service Land Settlers	193	206
Lectures, demonstrations, field days	155	221
Agricultural Shows, Ram Sales, etc.	82	88
Radio Broadcasts	—	82

Since two districts were only staffed for four months of the year and considerable district work was disorganised by excessive rains and flooding, a very real increase in extension activities is apparent.

Considerable flood relief work was performed by district officers for the State Emergency Service.

A notable feature of the extension activities of the section was increased use of the press and radio as extension media, to focus attention and interest on current problems and promote rapid dissemination of information concerning them. There, of course, remained a very real need for individual extension visits, such that specific property problems relating to management and nutrition could be discussed on the spot.

Fat Lamb Production, Under Irrigation.—Further information on the potential for expansion of lamb production in the Murray and Murrumbidgee Irrigation Areas has been prepared by the livestock officer (sheep and wool), Leeton.

Competitions and Field Days.—The Merino Ewe Competition conducted by the Department in conjunction with the *Farmer and Settler* newspaper again attracted record entries. A new competition for fleeces, from entries in the competition, has been included. The recently incorporated section for sheep husbandry has proved of additional interest and good extension value.

The *Lamb Breeders' Ewe Competition* conducted in association with the Rural Bank attracted record entries, many of the highest class.

Fat Lamb Carcase Competitions were held at the Goulburn, Wagga, and Dubbo Abattoirs. Despite the season the entries were very satisfactory. This type of competition is meeting a long felt need in extension activities relating to lamb on the hook. Successful field days were held in association.

Publications.—The results of the Lamb Raising Trial at Yanco Experiment Farm, 1949-54, were reworked by the Government Printer. The Department's booklet on lamb raising has been completely re-written, and appeared in the *Agricultural Gazette of N.S.W.* over three issues. Articles dealing with the breeds of sheep in New South Wales have been prepared and are being published in the *Agricultural Gazette of N.S.W.* as opportunity offers. The article on the Polwarth breed has been reprinted from the *Gazette*, in pamphlet form.

Sheep Industry Projects at Experiment Farms, Stations and Colleges.—

Leeton Experiment Farm.—Experiment work connected with fat lamb production has been expanded. The following trials are now in operation:

1. **Early Lamb Production.**—A comparison of the performance of Border Leicester Merino cross and Dorset Horn Merino cross ewes, when mated to Dorset Horn rams.
2. **Economic Trial.**—Breeding from ewe lambs in comparison with the standard practice. The evaluation of results to be on the return per ewe over their economic lifetime.
3. **Double Lambing Trial.**—A pilot trial to obtain information on breeding performances.
4. **Nutritional Trial.**—To observe the influence of controlled nutrition on the breeding performance of Dorset Horn cross Merino and Corriedale ewes.

5. **Spring Lamb Production.**—A project designed to obtain more effective utilisation of pasture. It is hoped to implement this project during the spring of 1956.

Considerable success has marked the experiment programme at Leeton. It is noteworthy that *early lambs were marketed on 21st June, 1956*, in spite of the weather.

Yanco Experiment Farm.—

1. **Commercial Trial, for early lamb production.**—Comparisons of Romney, Merino, Border Leicester Merino, and Corriedale ewes for early lamb production. Incorporated in this trial is an experiment to compare the results obtained from the use of a controlled nutritional plane with those from an *ad. lib.* nutrition.
2. **Spring Lamb Production.**—Designed to obtain information on the merits of Southdown and Dorset Horn rams mated to Dorset Horn cross Merino and Border Leicester cross Merino ewes. Also incorporated in this trial is the comparison of the mating of maiden ewes to a small breed of ram (Southdown) and a larger breed (Dorset Horn).

Condobolin Experiment Farm.—

1. The project for the fixation of the Border Leicester Merino has been commenced and the first lamb drop has been marked. This is a long range project in which the collection and analysis of genetic data relating to the fixation of the breed will at least equal the importance of actual fixation of the breed.
2. Supplementary and drought feeding trials have not yet been commenced, but with the completion of the water supply scheme it should be possible to undertake these trials during the next financial year.

New England Experiment Farm.—

1. Investigation into the relative economy of dual purpose breeding, in comparison with lamb raising from east-for-age and surplus Corriedale ewes.
2. **Lamb Raising Experiments.**—Comparison of the Border Leicester Merino cross and Dorset Horn Merino cross ewes mated to Dorset Horn rams in the New England environment.

Temora Experiment Farm.—

1. Long range programme—breeding Hornless Dorsets. Progress has been slow over the years, as no completely polled ram had been produced. However, in this lambing, five ram lambs which are at present completely polled have been produced. It will be possible to make much more progress in this project if any of these rams proves homozygous.
2. Comparison of Corriedale and Polwarth sheep production on a commercial basis in the marginal environment. This is a pilot trial. The full-scale trial will not be inaugurated until sufficient ewes of ea-h breed have been bred under the same environment, for a true comparison.

Trangie Agricultural Experiment Station.—

The whole of the sheep on this Station are used in breeding trials and research work in Merino sheep production and in the investigation into the inheritance of sheep and wool characters; reported in earlier pages.

Shannon Vale Nutrition Station.—

1. Investigational work into the nutrition of Merino sheep for wool production and breeding performance in the New England environment.
2. Studies of the effect of improved nutrition on the growth and reproduction of Merino sheep.
3. A limited amount of lamb production under improved pasture conditions has been undertaken. Lambs from this project marketed in Brisbane realised the phenomenal top price of £6 18s. 1d., with an average of £6 8s.
4. A comparison of the performance of Cheviot Romney Marsh cross with that of pure Romney Marsh.
5. The surplus experiment ewes on Shannon Vale are being mated with Cheviot rams to produce Cheviot Merino first cross ewes which will be used in lamb raising investigations at New England Experiment Farm. It is considered that the Cheviot cross may offer some advantages in the severe climatic conditions experienced.

Cowra Experiment Farm.—

Commercial lamb production is gradually being replaced by experiment work. Information has been collected on birth weights and growth rates of lambs, and it is hoped to undertake here a programme of lamb production experiments in non-irrigation environment.

Wollongbar Experiment Farm.—

Arrangements have been completed for a pilot, lamb raising flock; to obtain information on the performance of breeding sheep in the coastal environment and to develop if possible a type of sheep husbandry for the conditions.

DIVISION OF DAIRYING.

In general terms the Division is concerned with the administration of Acts and Regulations, herd production improvement activities, and research and extension services, affecting efficiency in the dairying industry.

The 1955-56 season favoured the dairying industry, and total milk production continued to increase, despite mid-summer floods and the incidence of "three days sickness" in dairy cattle from the Queensland border south to and including the County of Cumberland.

Production figures for milk and butter were post-war records for New South Wales. Approximately 92,735,920 lbs. butter were manufactured compared with 88,119,717 lbs. in 1954-55.

Milk of high quality, from districts outside the Milk Board areas, was again brought in to supplement supplies.

Continuance of a concerted drive by dairy officers to improve the quality of milk and manufactured products, particularly butter, by check grading at factories, by farm instruction, press statements, radio talks, and general extension, appeared to halt the downward trend apparent in the quality of these products during the previous two years.

Flood Relief.—Investigation of flood relief claims from farmers in necessitous circumstances, on behalf of the N.S.W. Flood Relief Committee, again required dairy officers' time. Some 559 claims were investigated by dairy officers.

Legislation.—The Dairy Industry Act was amended during the year to provide for an increase in the total quantity of table margarine to be manufactured by licence holders. Previously, licence holders were permitted to manufacture up to a total of 2,500 tons; the amendment increased the permitted total to 9,000 tons.

Regulation 88 of the Dairy Industry Act was altered to provide for the transfer of the examination and marking of glassware used in the dairying industry from the Department of Agriculture to the Department of Weights and Measures.

Regulatory Services.

DAIRY INDUSTRY ACT, 1915-51.

Advisory Committee.—The Dairy Produce Factories Advisory Committee met on four occasions, once to consider a variation of the purposes for which a dairy produce factory could be used and on three occasions to consider new applications for registration. One registration was approved and two disapproved. At the 30th June, 1956, there were 106 registered produce factories and 73 registered dairy produce stores.

Appeal Board.—The Appeal Board, constituted under section 24 to deal with appeals against decisions of inspectors under the Act, did not have occasion to meet.

Dairy Produce Factories and Stores.—Factory plant, buildings and machinery have been kept at a satisfactory standard of construction and hygiene by co-operation between factory managers, directors and Departmental dairy officers. Plans and specifications of nine dairy produce factories and/or stores were submitted for approval of alterations and additions; and of one new dairy produce factory for cheese manufacture.

Certificates of Competency for Dairy Factory Operatives.—Five Dairy Science Schools were held, at various centres, with a total attendance of eighty-four. Certificates of competency were awarded to candidates on results obtained at these schools, at examinations of dairy factory operatives in their respective factories, and to holders of the Hawkesbury Diploma in Dairying. The details of certificates awarded were as follow:—

	Examination of Dairy Factory Operatives.	Dairy Science Schools.	Holder of the H.D.D.
Cheese Making	3	—	9
Milk Grading	35	—	3
Butter Making	11	—	9
Cream Grading	—	17	—
Milk Testing	—	27	—
Cream Testing	—	32	—

Butter and Cheese Grading.—The butter grading staff, depleted over the last three years, attained full strength at about the middle of the year, when an experienced grader previously employed by the Commonwealth Departments of Trade and Primary Industry was appointed, together with another officer for training.

The grading staff made regular examinations of butter and cheese manufactured in New South Wales, received at Sydney and Newcastle for distribution and storage prior to sale on the local market; and these commodities were also examined at Casino and Lismore by officers located in the Far North Coast Region, prior to storage for winter use.

The information obtained by the graders was in each case furnished to factory managers and district dairy officers to assist them in overcoming quality faults or other defects noted at the grading examination. Some 5,014 advice notes were issued.

Considerable quantities of interstate butter were also examined, at the request of selling agents handling distribution in New South Wales.

The number of boxes of butter from inter- and intra-state sources examined by State graders was 1,429,207, compared with 1,430,504 boxes during 1954-55.

The average moisture and salt content of butter manufactured in New South Wales was 15.5 per cent. and 1.37 per cent. respectively.

Officers of the Division served as judges and stewards in the Dairy Produce Section, Commonwealth District Exhibits, at the Royal Agricultural Society's Show, at the North Coast A. & H. Society Show, Lismore, Newcastle Shows, and for the Grading Competition held in conjunction with the Annual Conference of the Dairy Factory Managers' and Secretaries' Institute (N.S.W. Division).

Choicest Butter Percentage.—The percentage of choicest butter manufactured from cream was 78 per cent. based on conditions set out in the terms of the Order of Merit published each year by the Department for the information of factory managers. The comparative figures for the previous four years were:—

91.1%	1951-52
93%	1952-53
83.3%	1953-54
78.8%	1954-55

Order of Merit Certificates.—Certificates of Merit of the Department of Agriculture are awarded to factories which, in a given twelve months' period, submit for grading a prescribed percentage of their total "choicest brand" production, and of which 92 per cent. is found in the grading examination to be true to brand description. Certificates were gained by two factories in 1955-56, compared with three in 1954-55, nil in 1953-54, five in 1952-53 and five in 1951-52.

Products other than Butter.—The position of "Special Dairy Officer (Products other than Butter)" which had been vacant for twelve months, was filled. The availability of this officer, with assistance by a dairy officer specialising in cheese and in conjunction with the grading staff at Sydney and Newcastle, meant better coverage of cheese grading. As many samples as could be identified were graded. Factories were frequently contacted and advised to mark cheese clearly, so that more than one manufacturing date would be discernible.

Milk and Cream Quality.—Officers visited dairy produce factories to check grade the milk quality (250 visits) and cream quality (700 visits). Arising from those factory visits 4,190 farms were visited to give farmers advice on how to overcome the defects. One hundred and thirty-six special visits to farms and 161 to factories were made in connection with the quality of dairy products manufactured.

Margarine.—Licences to manufacture table margarine were issued to six manufacturers; four of these manufacturers own hydrogenation plants responsible for the conversion of oils to fats which make possible the manufacture of margarine.

The quantity of table margarine exported to other States could not be ascertained. Returns were not furnished by manufacturers, as the validity of the Dairy Industry Act was being contested before the court.

Permits for the manufacture of table margarine for export outside Australia were issued for a total of 10,750 tons.

DAIRIES SUPERVISION ACT, 1901-1930.

Many new dairy premises have been constructed and older-type premises brought up to requirements under the supervision of dairy officers. Officers inspected 4,788 dairies, and the inspections gave rise to 241 remedial orders. No prosecutions were launched under this Act.

PURE FOOD ACT.

Five prosecutions for breaches of the Act were launched and resulted in fines plus costs against the defendants.

FACTORIES AND SHOPS ACT.

Dairy officers inspected on behalf of the Department of Labour and Industry the amenities of employees and the measures taken for their protection from dangerous machinery in dairy produce factories.

Herd Production Improvement Scheme.

Herd Recording.—During the year seventy sub-units operated with a grand total of 70,500 cows being recorded; 5,500 under the Official Scheme and 65,000 under the Group Scheme.

The appointment of five relief herd recorders eased the difficulties associated with resignations, illness, recreation leave, etc., but the need was felt for the appointment of a senior organiser or a dairy officer to supervise in certain advanced duties, to work from head office for the purpose of special check recordings on Official Scheme herds. He would also maintain a general oversight of stores, equipment, and propaganda material in various districts.

The following are comparative figures for the Group Herd Recording Scheme; for the past five years:—

Group Scheme of Herd Recording: Five Years' Comparisons.

Cows Recorded. Year.	Average Butterfat per Cow.	Cost of Scheme.						Totals.					
		Contributors.											
		Commonwealth Government.		State Government.		Participating Farmers.							
		lbs.	£	s.	d.	£	s.		d.	£	s.	d.	
1951-52—43,345.....	176-0	16,976	8	6	23,249	6	4	10,634	10	7	50,860	5	5
1952-53—56,079.....	201-0	19,730	12	1	27,583	1	0	11,878	3	3	59,191	16	4
1953-54—58,667.....	186-0	16,301	12	4	24,182	7	8	24,722	9	6	65,206	9	6
1954-55—58,216.....	208-0	17,934	6	8	27,989	0	7	25,813	19	5	71,737	6	8
1955-56—65,000.....					Not Available.								

Punch Card Equipment.—The change over to mechanical handling of Group Scheme herd record work has commenced. The usual difficulties associated with any major change were experienced but are being overcome, and the system will be fully operative in the near future.

Calf Marking Scheme.—Interest has been maintained in this Scheme. It was devised as a means of providing positive identification for female replacement stock. During the year 6,385 calves were marked. This brings the total of calves so marked to 43,459. These calves are located in 1,264 herds. A further 556 calves from artificial insemination were marked, bringing the total number of calves obtained by this means, so far marked, to 985.

Certified Bull Scheme.—To date, applications for 550 certificates have been received in respect of bulls; and 378 certificates indicating the eligibility of calves of those sires to be marked as merit calves have been issued.

Sire Survey.—The extraction of progeny records was halted by the resignation of the statistical officer concerned. The work was discontinued pending its absorption in the mechanical punch card system. Publication of results, of most value soon after their completion, has consequently been delayed.

Herd Wastage.—The results for the last four years have been summarised and submitted for publication.

Artificial Stock Breeding.—Money being no longer available from the Government for the purchase of bulls for the Hunter Valley Artificial Stockbreeding Centre, there was less call on the services of this Division to aid in the selection of bulls. One Jersey, one Guernsey and two Friesian bulls purchased by the Overseas Stock Buying Delegation of 1955 have been leased for use at the Aberdeen Centre. Other bulls purchased overseas are being tested prior to going into use at the Berry Artificial Stockbreeding Centre which has now been taken over by the New South Wales Milk Board.

Dairy Bull Loan Scheme.—This Scheme continued to function but very few bulls were placed on loan. With the influx of fresh imported blood it will no doubt be necessary over the next few years again to make use of this Scheme to facilitate adequate proving of the bulls.

Publicity for Herd Improvement Matters.—Publicity covering herd improvement activities was prepared for inclusion in the publication *Dairy Topics* which replaced *The Herd Recorders' Letter*. Bulletins covering herd improvement have been revised, and details of progeny recorded bulls and register of merit cows were prepared for publication.

Control of Government Herds.

Government Dairy Studs continued to receive considerable attention. Cattle exhibited in the 1956 Sydney Royal Show performed very satisfactorily, particularly in the Guernsey section.

The cattle transferred to Yanco from Wollongbar appeared to have become acclimatised and much better production figures were obtained.

Arrangements were made for the importation of a batch of Friesian semen under deep freeze conditions. From a total of twenty-two inseminations, ten pregnancies resulted and five animals were born—three females and two males. The calves were all very healthy and vigorous and of excellent Friesian conformation.

Despite the greater percentage of wastage of semen through deep freeze, the method opens up a vast potential for the use of overseas cattle in circumstances where conception rate is not the major consideration.

Extension Services.

Production Improvement Project.—There are 116 farmers participating in this Project.

Special Schools.—The following short-term special schools were conducted:—

(a) **Dairy Science Schools.**—For instruction and examination of factory operatives for certificates of competency in milk and cream testing and cream grading, five Schools were held with a total attendance of eighty-four candidates.

(b) **Junior Dairy Officers' Refresher School.**—A refresher course of instruction in dairy produce factory operations was held in the new School of Dairy Technology at Hawkesbury Agricultural College. Addresses and lectures by Departmental officers and by representatives of the Department of Public Health and the Department of Labour and Industry, on services rendered by the dairy officers for each of these Departments, formed portion of the course. Twenty-six officers of the Division of Dairying attended the School.

In addition, officers of the Division lectured candidates at the dairy farmers' school conducted by the Hawkesbury Agricultural College in the winter vacation.

Considerable time was devoted by officers of the Division, in an advisory capacity, to the Dairy Produce Factories Apprenticeship Scheme and in lecturing at the Schools for Dairy Produce Factory Operatives conducted at Hawkesbury Agricultural College and Newcastle Technical College.

General Extension.—Officers made 2,820 visits to farms for the purpose of general extension activities.

Country Agricultural Societies' Shows.—Officers attended thirty-five country Shows. They assisted in judging dairy cattle and as stewards or judges in Dairy Produce Sections.

War Service Land Settlement.—Dairy officers continued to undertake inspections of estates proposed for allotment to ex-servicemen and to give special advisory attention to soldier settlers.

Dairy Farm Competitions.—Officers continued to act as district judges in the Farmer and Settler Newspaper's dairy farm competitions and, in conjunction with other Divisions' specialists, in judging State finalists.

In view of the small number of entries new conditions and rules were formulated and sent to various Departmental officers and farmers for comments and suggestions. After consideration, a new competition which differs greatly from the original was adopted, and titled the Farmer and Settler Dairy Farm Improvement Competition.

Dairy Industry Extension Grant.

The allocation to New South Wales under the Commonwealth Dairy Industry Extension Grant was £64,879. Unspent allocations (£20,029 4s.) brought forward from the financial year 1954-55 made a total of £84,908 4s. available for expenditure under the approved headings:—

- Grade Herd Recording.
- Sire Survey and Herd Wastage.
- Farm Demonstrations.
- Salaries and Expenses of Organising Officers.
- General Publicity.
- Artificial Stock Breeding Station, Berry.
- Purchase of Bulls.
- Punch Card Equipment.
- Temporary female staff engaged on statistical work.

Advisory Committee.—The work previously handled by this Committee has been attended to by Mr. G. McGillivray, Chief, Division of Dairying, Mr. J. Davison, Senior Dairy Officer (until his retirement in March, 1956) and Mr. E. Panton, Senior Organising Officer, Commonwealth Dairy Industry Extension Grant. The services of appropriate officers of other Divisions have been co-opted when necessary.

Farm Demonstrations.—The establishment of 120 new demonstrations during 1955-56 was approved, ninety-four of these were improved pasture demonstrations, nine were silage making demonstrations and seventeen were cut worm control demonstrations. Excessive rain in the autumn of 1955 prevented the sowing of pastures on many demonstrations and seriously affected the progress of others. Consequently the sowing was deferred where necessary until autumn 1956.

Because of the excessive rainfall in the autumn, particularly in the Lismore, Coffs Harbour, and Maitland districts, fifty-nine demonstrations which would normally have terminated in 1956 have been carried over for a further year. Sixty-six demonstrations were terminated as such on 30th June, 1956, following successful establishment of pastures.

District dairy officers have reported that farm demonstrations have appreciably affected dairy farming practices generally. Considerable areas of improved pastures were sown during the year by farmers, as a result of field days held on demonstration farms and of publicity given to increased production per cow and per acre achieved on Dairy Grant demonstration farms.

Field Days.—Thirty-seven organised field days were held on demonstration projects; nine silage filling demonstrations (pit and clamp silos) and twenty-eight pasture demonstrations. Seventeen demonstrations were held for cut worm and/or caterpillar control.

Film Evenings.—Fifty-one film evenings were conducted by dairy officers, apart from any promoted in dairying parts of the State by officers of other Divisions or by branches of the Agricultural Bureau of their own volition.

Publicity.—Matter was prepared for publication in *Dairy Topics*, the bi-monthly publication (cir. 18,000) which is now posted direct to all dairy farmers in New South Wales, the weekly *Press Copy* and the *Agricultural Gazette of N.S.W.*

Extension Displays.—The display artist/designer's contributions to dairy industry extension service, through displays, lecture aids, field day aids, and publications' improvement are reported under "Division of Information and Extension Services".

Photographic and Radio Aids.—Similarly, the photographic aids and radio contributions to dairy industry extension services are reported under "Division of Information and Extension Services".

Miscellaneous.

Interstate Visits.—The special dairy officer (products other than butter) visited Victoria to gain first hand information on the latest methods of manufacture of all types of casein, as an additional outlet for skim milk.

The dairy officer specialising in cheese attended a conference on cheese quality at Portland, Victoria, organised by the Australian Cheese Manufacturers' Federation and the Australian Society of Dairy Technology.

Overseas Stock Buying Delegation.—The Chief of the Division of Dairying, who was a member of the Department's Overseas Stock Buying Delegation led by the Minister, returned to Sydney on 11th September, 1955. Nineteen head of dairy stock, as under, were purchased by the delegation for location in Departmental studs and/or at artificial breeding centres:—

	Males.	Females.
Jersey	4	—
Guernsey	3	1
Friesian	7	1
Ayrshire	1	2

New School of Dairy Technology.—The existing staff of one special dairy officer, one dairy officer and one dairy officer (research), were augmented by the appointment of three additional dairy officers and one dairy officer (research). These appointments ensured that students would receive training in all aspects of dairy produce manufacture. The three dairy officer appointments from the Division have depleted the availability of trained staff for other purposes but a very useful purpose is being achieved by their training of further officers.

Developments in Deniliquin Dairying District.—The development of Wakool and Berrigun Irrigation Areas has resulted in a further increase of dairying activities in that part of the State. This is illustrated by the fact that twenty-three new dairies were established during the year, bringing the total of new dairies established during the past four years to seventy-nine.

Dairy Officers' Conference.—A conference of district dairy officers was held in Sydney to coincide with the Jubilee Conference of the Factory Managers' and Secretaries' Institute. A dairy machinery exhibit displayed by the machinery trade in conjunction with the Jubilee Conference was of special interest to the dairy officers.

Waterside Cold Stores Fire.—Specialist officers of the Dairy Division were called upon to suggest ways and means of salvaging butter and cheese stored in the Waterside Cold Stores during the serious fire which occurred there, and to examine it for fitness for human consumption. Most of the butter was fit for that purpose.

DIVISION OF SCIENCE SERVICES.

Biological Branch.

PLANT PATHOLOGY SECTION.

NEW PLANT DISEASES.

One hundred and two new plant diseases were recorded in New South Wales.

Due to the very wet weather at the beginning of 1956, root rots caused by species of *Phytophthora* were very prevalent. The host range of *P. cinnamomi* in New South Wales was extended by seventeen new records, mostly on native and ornamental plants, and numerous other records of root and crown rots caused by *Phytophthora* spp. were made.

Several new pasture diseases were recorded, some of the more important being clover rot (*Sclerotinia* sp.) on red, white and crimson clovers; scorch (*Kabatella caulivora*) on subterranean clover; and a number of leaf spots which could be severe under favourable weather conditions.

Other interesting diseases recorded were white leaf spot (*Cercospora brassicae*) on brussel sprouts and wild turnip; leaf nematode (*Aphelenchoides oleistus*) causing severe damage to several types of fern; and broad bean wilt virus, which was recorded on eight new hosts.

CEREAL DISEASES.

Wheat Diseases.—Weather conditions were very favourable for disease development in many areas and also directly caused severe losses. Considerable damage was caused by winter and spring frosts, and later losses due to hail were about 2.7 per cent. of the total yield, an estimated loss of 1,600,000 bushels.

The two most serious diseases during the season were stem rust (*Puccinia graminis tritici*) and node damage and glume blotch (*Septoria nodorum*). In western districts, rust reached epiphytotic proportions and was more severe than for ten years past. Severe damage occurred to some varieties, including Bencubbin, Koala, Insignia and Pinnacle, but others such as Charter, Festival, Celebration and Gabo were little affected. Heavy rust was reported from some areas on Festival.

The node breaking and glume blotching caused by *Septoria nodorum* developed late in the season. In many cases there was severe node damage, resulting in elbowing and lodging of crop, with very little glume attack. In some areas, the glumes and the top 6 to 10 inches of the stem were damaged and severe reductions in yield occurred. The variety Warigo appeared to be particularly susceptible.

Other diseases causing losses were take-all (*Ophiobolus graminis*), severe in the Wagga area, and bunt (*Tilletia tritici*), still prevalent in many southern and western district crops, mainly due to farmers' failure to apply seed dusts.

Maize Diseases.—Crops on parts of the North Coast were the worst for many years, due to cob and stem rots resulting from the wet winter of 1955 and the waterlogging of young crops during the heavy rain in the first three months of 1956. Many crops were fed off. Rust (*Puccinia sorghi*) was also prevalent. Head smut (*Sphacelotheca reiliana*) was prevalent in a few crops; in one case the variety emblem appeared to be showing resistance to the disease whilst the variety victory was completely susceptible.

DISEASES OF CLOVERS AND LUCERNE.

Clovers Diseases.—Several new clover diseases were recorded. On subterranean clover, seorch (*Kabatella caulivora*) caused severe damage to the varieties Mount Barker and Bacchus Marsh in the Berrigan Irrigation Area and burn (*Sphaerulina trifolii*) was widespread as a small leaf spot but caused minor damage only. Rot (*Sclerotinia* sp.) was recorded on white, red and crimson clovers and caused severe damage in some areas.

Virus diseases of clovers were also prevalent. An aphid-transmitted virus disease of subterranean clover, causing stunting, twisting and discolouration of leaves was widespread over southern New South Wales during the winter and spring of 1955 and resulted in some reductions in grazing. Most of the affected areas recovered later, and subsequent seeding was little affected. The disease was only present at a low level during the early winter of 1956 and does not appear to be seed transmitted. Another virus disease, rugose leaf curl, was reported on red clover from Grafton, and, in the autumn of 1956, greening was prevalent on clovers in many districts.

Lucerne Diseases.—During the very wet period at the beginning of 1956, many lucerne stands were waterlogged and root rots were widespread. Several organisms were found associated with the disease and in one case a species of *Phytophthora* was isolated. Some coastal stands were completely destroyed by waterlogging. Leaf spot (*Pseudopeziza medicaginis*) and rust (*Uromyces striatus*) caused severe defoliation in some areas, and, during the late summer and the autumn, witches broom was prevalent.

TOBACCO DISEASES.

Bacterial wilt (*Pseudomonas solanacearum*) was severe in tobacco seedbeds at Bourke and blue mould (*Peronospora tabacina*) also caused some damage.

DISEASES OF VEGETABLES.

Late Blight of Potato (*Phytophthora infestans*).—Weather conditions on the tablelands in late summer and autumn were conducive to development and spread of late blight which has not been of importance since 1950-1951. A relatively late outbreak on the northern tablelands resulted in some crops being a complete loss but, in that area generally, losses through tuber rotting were less than originally expected.

On the central tablelands up to 25 per cent. loss occurred in the Orange and Millthorpe crops but losses were light in the Mudgee area. In the Crookwell section of the southern tablelands it was estimated that late blight and soft rots reduced overall yields by about 3 tons per acre.

In co-operation with the Division of Plant Industry the testing of seedlings for resistance to the "O" race of late blight is being continued. Tests to determine the reaction of a number of seedlings bred at New England Experiment Farm are in hand. The parents of these seedlings include the U.S. variety cortland and the Scottish seedling 835a-4, both of which contain gene R, which confers immunity to seven races of the pathogen. A composite inoculum of late blight isolates collected from coastal and tableland areas of New South Wales is being used in this work.

Potato Virus Diseases.—Records of certification inspections of tableland potato crops by the Division of Plant Industry have shown that no potato crop was rejected for excess leaf roll content during the season. This is the first season since the inception of the Potato Seed Certification Scheme that this disease has not been responsible for rejections, indicating the high degree of freedom from leaf roll that has been obtained in certified seed stocks in this State. N.S.W. certified seed is also particularly free from mild and rugose mosaic diseases.

The incidence of spotted wilt in potato crops was nil during the past season, and the incidence of purple-top wilt was negligible.

Bean Seed Certification Scheme.—The Bean Seed Certification Scheme was continued for the thirteenth successive season. Of 114 crops inspected, 86 were passed for certification, with an estimated yield of 2,060 bushels of which 1,145 bushels (56 per cent.) were brown beauty. Of the 28 crops rejected, 3 were rejected because of anthracnose and 1 because of the halo blight. Very wet weather and floods before harvesting lowered the quality of the seed, causing discolouration and allowing moulds to develop.

Bean Anthracnose (*Colletotrichum lindemuthianum*).—Several severe outbreaks occurred in coastal areas, and many affected consignments were received at the Sydney Municipal Markets. A collection of anthracnose isolates from various areas has been started and already over fifty are on hand. These are mainly from New South Wales but some are from Queensland and Victoria and will be used in race determination studies.

Most of the routine testing work for anthracnose resistance is now carried out at Hawkesbury Agricultural College, and testing work in the Biological Branch is mainly concerned with studying the reactions of several generations of cross-bred material to several races of anthracnose. This work is carried out in co-operation with Emeritus Professor W. L. Waterhouse, who has provided the cross-bred material. Some lines of Hawkesbury Wonder X Westralia have shown promising resistance and are already in the fifth generation. As well as providing resistant varieties with suitable agronomic characteristics, this work should also throw some light on the modes of inheritance of resistance to various races of anthracnose in many Australian varieties.

Fusarium Wilt of Tomatoes.—Co-operation with the Division of Plant Industry in a breeding programme for the production of tomato varieties resistant to fusarium wilt was continued, and cultures of pathogenic strains of *Fusarium oxysporum f. lycopersici* were supplied to Hawkesbury Agricultural College and Yanco Experiment Farm.

Virus Diseases of Tomatoes.—The yellow top disease previously recorded only from the coast has now been recorded in inland districts. Specimens have been received from Tenterfield, Bathurst and Coonabarabran. Outbreaks in the metropolitan area were severe and no successful control measure has yet been designed. Symptoms resembling a mild form of yellow top have occurred following experimental efforts to transfer the disease using the aphid *Macrosiphum solanifolii*.

Drop head wilt was of less importance in glasshouses at Mona Vale-Warriewood. This virus disease has not yet been recorded in outdoor crops. Serological tests, together with reactions on test plants, have confirmed that the causal virus is a strain of the tobacco mosaic virus.

Club Root (*Plasmodiophora brassicae*) of Cauliflower.—An experiment at Richmond in 1955, aiming to obtain an effective control of club root, has given encouraging results. Dipping of seedling roots, prior to transplanting, in a slurry of 4 per cent. calomel (mercurous chloride) on tale mixed with water, has given complete control of severe club root attack in infested soil.

This method has been found to be more practical for use in large-scale plantings than is the disinfection of each transplanting site with a fungicidal liquid or dust. These latter methods of disinfection were, however, tested. The application,

to transplanting sites, of a teaspoonful of 4 per cent. calomel on talc dust, or a $\frac{1}{2}$ pint of 1/2000 corrosive sublimate (mercuric chlorate), gave control equal to that of the slurry method of disinfection and could be or use if small plantings were being made in infested soil. In the experiment at Richmond, control rows of plants showed from 6 per cent. to 53 per cent. severe club root infection with an average of 26 per cent. Research on the use of fungicidal slurries to control club root will be extended to include other fungicides.

Fusarium Wilt of Rockmelon.—Glasshouse and field experiments were carried out to test the reaction of rockmelon varieties and some other cucurbitaceous plants to the strain of *Fusarium oxysporum* responsible for wilt of rockmelon plants at Brookvale in 1955. Under glasshouse conditions, all tested varieties of rockmelons proved susceptible, and the pathogen also attacked watermelon seedlings but did not attack pumpkin, squash, or marrow seedlings.

A field trial was conducted in naturally infested soil at Brookvale. The reaction of the early maturing variety Delicious 51, bred at Cornell Agricultural Experiment Station, New York, for resistance to fusarium wilt was compared with that of the early maturing coastal grown varieties bender's surprise, hale's best and P.M.R. 45. Delicious 51 showed field resistance to the pathogen but the other three varieties were highly susceptible. Delicious 51 would prove of value, should this disease appear in commercial rockmelon growing areas.

CITRUS DISEASES.

Scalybutt (Virus).—No further propagation has been made in connection with this investigation. Future work will be concerned with observations on the behaviour of trees planted in the last ten years at Yanco and Somersby. The earlier propagations are now starting to yield results. Scalybutt infected Washington navel oranges planted at Griffith in 1947 are now all scaling, with the exception of three trees. These have developed the prominent bench type of bud union, characteristic of a certain type of stunting of trees on trifoliata.

Trees of a seedling lemon selection worked on trifoliata in 1949 have grown well. They show no sign of scalybutt and the buds are enlarging, whereas scalybutt infected strains are now all showing symptoms.

Of seventy-five nucellar lemons of seven strains produced in 1951 for trial on trifoliata, fourteen have been retained as reasonably true to type and, of these, only four show real promise. Six show considerable overgrowth of stock by scion, an undesirable feature. One of these examined microscopically showed gum impregnated rings in the wood, gum at the bud union and gum in the phloem of the stock. Recent reports from California describe the failure of Troyer citrange (trifoliata hybrid) as a stock for lemons, with symptoms, developing at about five years, of yellowing of the scion and gum deposits at the bud union. A virus, widespread in California lemons, is suspected. Trees worked at Narara last year from lemon varieties imported from California were therefore destroyed and the parent trees were returned to quarantine. An examination of this problem has commenced, to determine its cause and, if virus, its presence in New South Wales lemons.

Heat therapy of scalybutt infected trees has been started.

Tristeza-Stem Pitting Complex (Virus).—A heat therapy cabinet similar to a Rothamsted development has been used for treatment of virus infected citrus seedlings. The seedlings withstood the continuous heat well, but treatment for ten weeks at 36°C. failed to eliminate stem pitting and tristeza viruses from infected tissues and to prevent the invasion of new growth made in the cabinet.

As a stock the merton citrange (trifoliata hybrid) appears to be susceptible to tristeza type decline. Trees of orange and ellendale mandarin on this stock at Somersby and Narara have made little or no growth since they were planted out two and three years ago. Grapefruit are growing reasonably well, indicating that the stem-pitting virus, which is present in grapefruit, is probably not involved in the decline. Of grapefruit selected to include a range of mild to severe stem-pitting symptoms, the trees from severely affected parents are now at three years showing considerable pitting. The others are symptomless so far.

Further observations on the growth of stem pitting infected orange seedlings on seville stock confirm the view that tristeza and stem pitting are unrelated. Work with sweet lime indicator seedlings under glasshouse conditions have shown that symptoms similar to those described for the virus disease xyloporosis in Palestine and Florida can be produced by strains of the stem-pitting virus. The addition of tristeza does not alter the symptom development. This supports the recent claim by Reichert (Israel) that xyloporosis and stem pitting are caused by the same virus.

In stock trials at Hawkesbury Agricultural College, Washington navel oranges on sweet lime stock now about 14 years old show typical xyloporosis symptoms. Lemons on sweet lime have also proved a failure in Division of Horticulture trials, indicating that the stem-pitting virus and not tristeza is involved in the decline.

Psorosis type Diseases (Virus).—Progress has been made in recording affected trees. In a block of 235 fifteen-year-old Valencia orange at Pitt Town, 40 per cent. showed leaf symptoms though most were very well grown and only two showed bark symptoms. Heat therapy of psorosis infected seedling trees has been commenced.

Lemon Crinkle (Virus).—At Somersby about 100 twenty-five-year-old eureka lemon trees and some propagations from one of them were found to be infected. The disease symptoms were mild except in three trees. In a Lower Hawkesbury orchard a block of about 200 twelve-year-old trees was found to be infected. There was no evidence of reduced vigour, and fruit were unblemished. The trees had a record of consistent heavy cropping.

A severe and a mild strain have been used in glasshouse experiments and seedling reactions obtained. There is no evidence of relationship with psorosis virus.

Decline of Sweet Orange on Rough Lemon Stock.—Evidence of spread of this disease was seen in a Raymond Terrace orchard and at Upper Colo. No seedling indicator has yet been found. The only reliable symptom, apart from stunting and decline, appears to be the overgrowth of the scion. Pitting of the surface of the wood of the stock, though often very prominent, is not always present. It is not now considered that this disease is related to xyloporosis (see above).

Mandarin Brown Spot.—Spraying trials were conducted this year at Pitt Town. Very heavy rain during February and March, 1956, severely tested the adhesiveness of the sprays. Fixtan, zineb and ziram were ineffective, zinc bordeaux gave moderately good control, and a micronised copper oxychloride showed remarkable adhesion and gave good control. Copper oxychloride plus zineb was excellent and zinc bordeaux plus zineb no better than zinc bordeaux alone.

Trials using supplementary potash soil dressings were commenced in combination with spray trials.

Root Rot (Phytophthora citrophthora).—Record rains during February and March, 1956, resulted in much waterlogging and a further decline of already affected trees throughout the central coast. Three floods of the Hawkesbury River in close succession have destroyed a large proportion of the 2,500 acres of young trees planted since 1952, and of thousands of older trees which had survived the 1949-52 flood periods. It is presumed that, following the first flood, zoospore formation on the waterlogged soil surface was intense and that the second flood, which, though not so high at first, caused more damage, was loaded with infective material. All submerged leaves and fruit were lost and multiple infection of branch and trunks occurred, resulting in death of trees. Trees on trifoliata stocks also died. No pathogen has been found in these. It is thought possible that death resulted from the decomposition of masses of organic matter caught round the trees, in the periods of high temperature which followed the first flood.

Sudden Death.—Isolates of wood rotting basidiomycetes have been obtained from samples from West Pennant Hills and Terrigal and are under trial.

Magnesium Deficiency.—Trials, in collaboration with the Division of Horticulture, in a Tocumwal orchard, yielded no clear-cut results from the use of magnesium sulphate as a spray.

Manganese Deficiency.—Manganese deficiency symptoms developed very strongly in Hills district orchards, near Sydney, and tree vigour was very adversely affected. Good response was obtained to spray applications of manganese sulphate plus lime. One pound of manganese sulphate per hundred gallons, though greatly improving tree appearance, was not completely effective in removing all symptoms. Four and five pounds per hundred gallons gave complete control.

Yellows.—This disorder has been much less prominent in the past autumn. Anatomical studies of affected leaves have been made and these indicate a fall in the amount of calcium oxalate crystals as yellowing increases. The possibility that a calcium deficiency is involved and that yellowing is the result of oxalic acid in the leaf tissues is being investigated.

Citrus Nutrition.—Pot studies on the nutritional status of Somersby soil continued. A series of large pots of 70 gallons capacity has been constructed. The pots will be filled with soil from the Somersby Citrus Research Station, with various amendments, and planted with citrus in the spring of 1956.

DISEASES OF DECIDUOUS FRUITS.

Black Spot (*Venturia inaequalis*) of Apple.—Infection conditions were particularly favourable throughout the season in most districts, and the disease reached epiphytotic proportions wherever spraying schedules or spraying equipment were inadequate. Excellent control was obtained with many of the modern fungicides, provided the orchardist followed the schedule of sprays recommended by this Department. This schedule, based on ascospore discharge investigations, calls for frequent sprayings, particularly from the "pink" stage, at the beginning of October, until the end of November.

Ascospore discharge studies were continued and for the eighth successive year the period of peak maturity of perithecia was found to be about "petal-fall".

The results of the ascospore discharge work suggest that the importance of the pre-bloom Bordeaux mixture sprays may have been over-emphasised. An experiment at Batlow indicated that the concentration of the "green-tip" and "spur-burst" Bordeaux mixture sprays could be reduced to as low as 5-5-100, but that spraying at both stages is required for maximum control. Where neither spray was applied, black spot infection was so severe that nearly all the fruit were shed. It was also found that equal control was obtained with copper oxychloride at normal and at half strength, and with a mixture of lime sulphur 1-20 plus a compatible semi-dormant oil 1-100, at "greentip", followed by Bordeaux mixture at "spur-burst".

A fungicide testing experiment was carried out at Orange. The results have yet to be analysed; but there appears no difference in control between any of the fungicides used, except that lime sulphur may be slightly inferior. The other fungicides, all of which gave excellent control in a schedule of thirteen sprayings, were thiram, ziram, zineb, zineb plus lime casein, captan, phenyl mercuric chloride and phenyl mercuric chloride plus wettable sulphur. In the two latter, mercury applications were replaced by lime sulphur, after the end of December, to avoid toxic residues on the fruit at harvest. In these two, and the lime sulphur treatment, fruit size was noticeably smaller than in the other five treatments. The season was conducive to the development of bitter pit; which was particularly severe in the thiram and ziram plots, slight with zineb and captan, and absent in three treatments involving lime sulphur during the ripening period.

The use of organic fungicides, particularly thiram and captan, is expanding at the expense of lime sulphur; and a great deal of interest is being displayed in the organic mercury compounds. Superior quality fruit is being produced under schedules using these organic fungicides, although there have

been several instances of severe bitter pit this season in big fruit from Granny Smith crops thinned and sprayed with thiram.

Field observations have indicated that, where thiram has replaced lime sulphur for black spot control, cropping has become more regular and fruit yield over a period of years has increased. In an experiment at the New England Experiment Farm, designed to compare apple yields over a period of years under these two fungicide treatments, it was found at the end of the first year that the total yield after thiram was less than after lime sulphur, due largely to the crop thinning effect of thiram. The lime sulphur treated trees averaged 406 fruit per tree (weight 149 lb.) while the thiram treated trees averaged 300 fruit per tree (weight 129 lb.).

Apple Black Spot Eradication Experiments.—Investigations into possible black spot eradication by spraying with an eradicant fungicide before leaf-fall were continued. Two small, isolated, heavily infected orchards at Tumorrana were sprayed with 0.1 per cent. P.M.C., using improvised equipment, in the autumn of 1955, and received no subsequent spray. In each orchard the crop was harvested with approximately 1 per cent. of the fruit affected with black spot after one of the wettest seasons on record. Both were treated with 0.1 per cent. P.M.C. again in autumn 1956.

At Maroota a heavily infected, well-isolated orchard of 220 trees was sprayed with 0.1 per cent. phenyl mercuric acetate in the autumn of 1955 and received no further spray until slight leaf infection was detected on five trees late in December, 1956. One spraying with lime sulphur was then given and the crop was harvested with only two fruit slightly infected. This contrasted with a comparable orchard 5 miles distant at Glenorie, where severe crop loss was sustained. The latter orchard was sprayed with an inadequate schedule of Bordeaux mixture and lime sulphur sprays. The Maroota orchard was treated with 0.1 per cent. phenyl mercuric chloride in the autumn of 1956.

At Orange the small orchard treated in the previous season was sprayed in the autumn of 1955 with 0.5 P.M.C. A moderate infection developed on the six trees left unsprayed during the 1955-56 season. This failure was due to inadequate isolation or insufficient concentration of the chemical, or to the particular formulation of the product used. It differed from the product used in all other experiments.

Further investigations into the effectiveness of various concentrations of phenyl mercuric chloride were carried out at Batlow and Sydney. It was found that the saprophytic development of *Venturia inaequalis* was inhibited by autumn



Eradication of a Fungus.

Using the isolated Yetholme district as a "pilot" area the Biological Branch has initiated an autumn spray schedule intended to eradicate the apple black spot fungus (*Venturia inaequalis*).

(Photo from Western Region.)

treatment with phenyl mercuric chloride at 0.1 per cent., 0.075 per cent., and 0.05 per cent. concentrations. At 0.025 per cent. there was slight development of perithecia. This experiment is being repeated.

In an experiment to determine the role of leaves which fall before harvest, in the saprophytic phase of the life cycle of *Venturia inaequalis*, it was found that leaves which fell during January, February and March failed to develop perithecia.

The fungus developed freely in those leaves which fell during April, and abundantly in those which fell during May. This experiment is being repeated but with fortnightly collections during April and May.

Apple and Pear Black Spot Control Demonstration.—In collaboration with the Division of Horticulture, a demonstration of the value of the autumn eradicant control technique was commenced at Yetholme. All apple and pear trees (approx. 170 acres) in the district were treated with phenyl mercuric chloride, and the treatment will be repeated in the autumn of 1957. This demonstration is being financed through the Commonwealth Agricultural Extension Grant.

Black Spot (*Venturia pyrina*) of Pears.—Thiram is still the outstanding fungicide for use on pears. It gives very good control of black spot, has no phytotoxicity, and allows the production of excellent quality fruit.

Powdery Mildew (*Podosphaera leucotricha*) of Apples.—This disease is beginning to limit the use of organic fungicides on susceptible varieties. Jonathan is an example.

Limb Canker (*Botryosphaeria ribis*) of Apples.—An experiment at Dural showed that complete control of the bud and spur blight and lateral canker phases of this disease could be obtained with a Bordeaux mixture spray at "green-tip" followed by thiram at "petal-fall" and first and second cover. No limb canker has yet appeared in these plots.

Virus Diseases of Pome Fruits.—No further spread of apple mosaic occurred in the block of young Jonathan apple trees under observation at West Pennant Hills.

Flat limb of Gravensteins, believed to be a virus disease, is widespread and has been found in Gravensteins growing on their own roots.

Green crinkle of apple was found extensively in an orchard at Uralla. It was also detected in a small orchard at Vittoria near Orange.

A "measles" condition common in Early McIntosh apple is being investigated. Propagations have been made at the Gosford Research Station but at the end of the first season no definite evidence of transmission had been obtained.

A condition known as "ringworm" was detected in a Williams pear tree at Orange. Propagations from this tree were made at the Gosford Research Station and, at the end of the first season, symptoms suggestive of virus transfer were observed in one tree.

Symptoms identical with those described in New Zealand for the virus disease thumb mark were observed on a Granny Smith apple tree at Batlow.

Brown Rot (*Sclerotinia fructicola*) of Stone Fruits.—Epiphytotic of brown rot occurred in all districts. Many districts experienced record rainfall for the growing season, and in many instances the brown rot infection potential was greatly increased by widespread hail damage. Thiram was widely used and gave very satisfactory control, where spraying schedules were adequate and provided severe hail damage did not occur. Many growers also reported favourably on ziram and captan. The latter caused some injury on peaches in the M.I.A.

Bacterial Canker (*Pseudomonas syringae*) of Cherry.—In an experiment on young cherry trees at Orange streptomycin sulphate as a 100 p.p.m. spray was used. No infection occurred in the unsprayed trees and consequently no result was obtained. The maximum treatment consisted of fortnightly sprayings for twelve months. Further experiments were commenced in the autumn of 1956 using 100 p.p.m. spray of streptomycin nitrate.

Rust (*Puccinia pruni-spinosae*) of Prunes.—In an experiment at Young it was found that a three spray schedule of zineb plus white oil gave very good control of prune rust. It was superior to the weak Bordeaux mixture schedule which gave such good results the previous year, and it caused no injury. Thiram plus white oil gave better control than thiram alone had given in the previous season. Captan also gave good control, and the old schedule of lime sulphur sprays allowed the heaviest infection. In another experiment at Young where thiram, Bordeaux mixture, and lime sulphur treatments were carried on in the same plots as in the previous season, a higher

yield of larger, better quality fruit resulted from the thiram treatment. The approximate yield per acre of dried prunes from thiram, Bordeaux mixture, and lime sulphur respectively were 14½ cwt., 12 cwt. and 12 cwt.

An investigation into the variable damage caused by weak Bordeaux mixture rust control sprays on prune trees at Young indicated that the amount of injury was not related to the level of nutrition of the trees.

Shot-hole (*Clasterosporium carpophilum*) of Apricots.—The use of thiram at shuck-fall has led to improved control of shot-hole and at the same time has helped in brown rot control. Thiram seems at present to be the only fungicide which is completely safe to use on apricots when in foliage.

Root Rot (*Phytophthora cinnamomi*).—As a result of the prolonged waterlogging of soil during February and March, 1956, this fungus killed many thousands of peach and apricot trees in the coastal districts. The greatest losses were in nursery and young orchard trees. The extent of the damage will be more apparent in the 1956-57 season.

Crown Gall (*Agrobacterium tumefaciens*).—Some field evidence suggested that certain peach varieties bearing white-fleshed fruit were less susceptible to crown gall than trees on the usual stock yellow-fleshed Pullar's cling. Seedlings from two self-fertilised white-fleshed peaches, and Pullar's cling seedlings, were grown in soil infested with crown gall bacteria. All were found to be fully susceptible.

Cherry Leaf Spot (*Coccomyces hiemalis*).—No further evidence of this disease has been detected since eradication measures were taken in 1950.

Silver Leaf (*Stereum purpureum*).—Silver leaf was detected on an apricot tree at Kurrajong. The tree was burned, and a survey will be made in the 1956-57 season for silver leaf trees, with a view to eradication. The first record of this disease in N.S.W. was on apple in 1912. However, it is believed to be of limited distribution. It has only been recorded on one occasion prior to 1956 in the last twenty years.

DISEASES OF TROPICAL FRUITS.

Bunchy Top of Banana (*Virus*).—Successful control was again maintained. The high cost of control has led to consideration of the institution of an eradication campaign based on restriction of the vector and its attendant ants, by stool and ground spraying with dieldrin. Experiments are in progress.

Leaf Spot (*Cercospora musae*) of Banana.—Defoliation as a result of this disease and speckle (*Chlorodinium* sp.) was very widespread in the autumn and winter of 1956. Almost continuous rains in summer rendered spraying difficult or ineffective and low prices of fruit gave owners little encouragement.

DISEASES OF GRAPE VINES.

Downy Mildew (*Plasmopéra viticola*).—Spraying trials were conducted at Orange and Braxton. At Braxton six sprays were applied over a moderately dry spring and summer season (October to end of January). Only moderate downy mildew developed on unsprayed vines. Zineb and ziram gave outstandingly good control, and vines were vigorous and free of scald. Manam and captan were less satisfactory. Bordeaux mixture caused severe scald and reduction of vigour though it gave complete control of mildew. Copper oxychloride also caused severe scald, and gave less control than did Bordeaux mixture.

At Orange the weather was damp, and conducive to mildew development from early summer onward. Eleven sprays were applied over a period from November to March. Applied with this frequency zineb, ziram, captan, copper oxychloride and Bordeaux mixture gave very good control of downy mildew. Copper oxychloride and Bordeaux mixture each caused scalding but also controlled powdery mildew (*Uncinula necator*). Powdery mildew developed on vines sprayed with zineb, ziram and captan. Captan gave moderately good control of botrytis mould.

Moulding (*Botrytis cinerea*) of Grapes.—The unusually wet conditions in all parts of the State over the grape harvesting period led to great losses due to moulding, particularly in the Liverpool-Fairfield area (table grapes), in the M.I.A. (wine grapes), Orange-Molong area (table grapes), and lower Murray River districts (sultanas).

Bunch Stem Dieback.—This disorder was almost non-existent at Orange this year. Trial foliage sprays of potassium sulphate resulted in slight improvement of berry colour, but as stem dieback did not occur in untreated or treated sections no information on the effect of supplementary potash was obtained.

DISEASES OF STRAWBERRIES.

Virus Diseases.—Plants of the strawberry varieties, auchincruive, climax, richmond red, ettersburg, royal sovereign, phenomenal, cresswell seedling, and several unnamed varieties, were subjected to heat therapy. Climax withstood the treatment well, and treated plants are being grown at Bathurst Experiment Farm in isolation.

DISEASES OF ORNAMENTALS.

Following the exceedingly wet conditions of early 1956 there were some new records of ornamental plants being attacked by collar and root rots caused by *Phytophthora* sp., which is favoured by damp, warm soil conditions. The specimens were received from many parts of the State and included new records for the following plants: *Prostanthera lasianthes*, *dimorphotheca*, *penstemon*, *anchusa*, foxglove, *aquilegia*, *weigelia*, *zinnia*, *dahlia* and *leycesteria*.

Phytophthora cinnamomi was responsible for death of a number of liveoaks in Sydney Botanic Gardens, including one very large tree 70-80 years old, and also for spectacular destruction of liveoaks in Centennial Park. Only trees in well drained situations survived. In addition, *P. cinnamomi* caused death of numbers of native plants in undisturbed bushland in various parts of the coast.

Greening caused by tomato big bud virus has been prevalent in many parts of the State. Specimens of flowering peach infected with greening were received from Trangie. Geranium, cosmos, gaillardia and asters were all infected in different areas.

Ray blight (*Ascochyta chrysanthemi*) of chrysanthemum was again present but was not serious as in the previous year.

Gladiolus Corm Diseases.—An experiment is in progress to determine the effectiveness of new fungicides compared with the standard mercuric chloride treatment, when used as dips in pre-storage and pre-planting treatments. Some of the dips were found to retard emergence. The lysol treatment is one of the most severe in that respect. New improved cerasan and phenyl mercuric nitrate appear to be giving the best overall control of the corm diseases, bacterial scab, sclerotinia rot and botrytis rot. Thiram plus an insecticide, aldrin, gave good disease control but only a few small corms were produced.

Broad Bean Wilt Virus in Ornamentals.—This virus was isolated from a number of previously unrecorded hosts, mostly in the metropolitan area. These included herbaceous and woody species, in a number of different families, as follow: *Ezochorda grandiflora*, *Syringa vulgaris*, *Digitalis purpurea*, *Vicia atropurpurea*, *Dianthus*, *Anchusa italica*, *Gladiolus*, *Ranunculus*, Shirley Poppy, *Cosmos*, *Lilium longiflorum*, *Helianthus*.

The incidence of infection in some areas was extremely high. There was a case of 100 per cent. infection of blue lupins, used as a green crop in the experimental nursery of the Snowy Mountains Authority at Cooma, and a case of 100 per cent. infection of broad beans in a rather isolated farm garden in the Oberon district.

MUSHROOM CULTURE.

The quality of commercial mushroom spawn supplied to growers continued to be satisfactory. Four spawn producers are now operating in New South Wales. At present the white strain is being cultured exclusively, as this strain is favoured on the fresh mushroom market. The increasing demand by canneries for mushrooms for soup making and canned mushrooms has, however, offered an outlet for the brown strain. This strain was reintroduced during the year by this Department from the United States of America, and cultures have been made available to commercial spawn producers.

PLANT DISEASES CONFERENCE.

This Conference was attended by delegates from all State Departments of Agriculture, the C.S.I.R.O. and other Commonwealth Government Departments, and the Universities of Adelaide, Queensland, and Sydney. The D.S.I.R., New Zealand, also sent a delegate. The Conference was held at Hawkesbury Agricultural College, Richmond, from June 27-July 1. All delegates were in residence.

BACTERIOLOGY SECTION.

The sampling and testing of dairy products for biological purity have been continued. Butter remains the most important product tested. Some sixty-seven samples of butter were biologically analysed for total, coliform, yeast, mould, and casein digester counts; fifty-seven samples, or 85 per cent., were found to be of unsatisfactory biological quality. This decrease in quality correlates with the decrease found by

sensory grading by officers of the Division of Dairying, but is more striking because of the method employed in the selection of samples for analysis.

Samples of water, milk, flour and industrial materials were also examined.

Cheese Starters.—The supply of vigorous cheese starter cultures has been continued. Investigations into the possibility of the distribution of freeze-dried cultures are nearing completion, and a satisfactory system of reconstitution has been evolved and demonstrated to the dairy industry.

Biological Surveys and Bacteriological Instruction.—Several surveys were conducted on dairy factory premises, to determine the efficiency of sanitary procedure. Water supplies were again the object of close examination. An increased amount of instructional work to factory personnel and dairy farmers was given. Four Dairy Science Schools, conducted by the Department, were attended by a bacteriologist; and a new instructional booklet was prepared for the purpose. Some instructional work was given in co-operation with the University of New England.

Cheese Mould.—The problem of mould on the surfaces of ripening cheeses is being investigated. Experiments designed to eliminate this surface contamination by means of dipping or treating with chemicals are in progress.

Nitrogen-fixing Bacteria.—Although the commercial production of peat cultures for legume inoculation is well established in this State, many reports of the failure of these cultures under field conditions have been noted. The manufacturers have formed a Legume Inoculant Association through which finance will be made available for laboratory and field testing of cultures, selection and testing of new strains of *Rhizobium*, and investigations on control in the manufacturing process.

Parts of the investigations along these lines are continuing in this laboratory, and field trials using a number of different commercial inoculants have been sown at Capertee in a poor sandstone soil of pH 4.8.

All cultures for testing are drawn from the distributor, rather than the manufacturer, in order to obtain cultures similarly to the farmer. Studies in this laboratory indicate that one strain may completely dominate others in multiple strain peat cultures. It appears that this could possibly be overcome by seeding the peat with a very heavy inoculum, to avoid subsequent multiplication in the peat, or by inoculating separate batches of peat with individual strains and allowing multiplication to take place before mixing the peats. As subsequent multiplication is reduced to a minimum in the peat, competition between the strains should be overcome.

Field trials at Capertee yielded interesting data on the effect of "basic" superphosphates on nodulation.

Where acid superphosphate was mixed with the inoculated seed at sowing only 15 per cent. of the plants were nodulated. Best results were obtained where equal parts of superphosphate and agricultural lime (CaCO_3) were mixed six weeks prior to sowing. When inoculated seed was sown with this mixture 95 per cent. of the plants were nodulated.

Where hydrate of lime was used, good results, 75 per cent. of the plants nodulated, were obtained when 14 or 28 lbs. were mixed with one cwt. of superphosphate. Larger quantities of hydrate per cwt. superphosphate depressed the nodulation, due to the high alkalinity of the mixture.

Nodulation was reduced by about 50 per cent. when inoculated seed mixed with 50/50 superphosphate was left overnight before sowing.

Further trials on the effect of fertilizers on nodulation are being carried out at Capertee this season, including the use of ammoniated superphosphate and lime-pelleted seed which are designed to protect the inoculum from acid superphosphate and acid soil conditions.

New strains of *Rhizobium* for clovers and medics have been obtained from various sources and their effectiveness has been tested in the laboratory by the agar-tube method. Most of these strains have been incorporated in trials at Capertee in order to determine their field performance. It is hoped to find a number of strains with relatively good field performance on a wide range of hosts, as such strains would be useful in mixed peat cultures.

Strain trials on various species of sub-tropical legumes have been sown at Grafton Experiment Farm in an attempt to find strains suitable for inoculation of these legumes.

Strain NA14 (SU298) of *Rhizobium trifolii* has been shown to be lysogenic and the serologically related strain NA13 (SU297) to be a susceptible indicator strain. Both strains have been used in multiple strain peat cultures and the release of a bacteriophage by NA14 may influence the competition

between these strains in peat. Investigations are in progress to determine the influence of bacteriophage on competition between strains.

Bee Diseases.—Of the fifty-four samples of adult bees, brood, and honey submitted by the Apiary Branch, infection by *Nosema apis* was found in thirty instances, and European Foul Brood was recorded in three samples.

Entomological Branch.

GENERAL.

The further season of above average rainfall considerably influenced the pest control problems. In such seasons widespread trouble may be expected from Australian plague locusts, sheep blowfly, Queensland fruit fly and cutworms; and special measures were necessary to cope with those problems as they developed in the various districts. On the other hand, such a season was distinctly unfavourable for black beetle which had plagued coastal areas for the previous two seasons; and a dramatic drop in black beetle numbers occurred.

Fortunately the Australian plague locust became really active only over south-western New South Wales. Ground control of hopper swarms was carried out to a degree unprecedented in this area and was supplemented by aircraft. Small aircraft were used to hold a line along the Lachlan River and prevent swarm flights to the M.I.A. This objective was largely achieved and the aircraft then moved to Yanco Creek. Using R.A.A.F. Dakotas a joint campaign was carried out with the Victorian Department of Agriculture and swarms were further reduced. Little damage occurred in this State. Very worthwhile information was obtained in the practice of locust control.

Sheep blowfly activity was considerable and flood conditions often prevented treatment of the sheep. These affects were intensified by the hold-up in shearing but insecticides like aldrin and dieldrin afford such protection that actual losses were kept to a bare minimum. Another new insecticide, diazinon, is expected to give protection equal to or better than the already known effective materials. *Diazinon* has been tested in sugar baits and has given extraordinary results in reducing house fly populations about piggeries, dairies and stables.

Queensland fruit fly was widespread throughout the State and occurred in some of the main fruitgrowing areas normally free from it. A recurrence in the M.I.A. was recorded, but fortunately the Murray River areas were not involved.

An investigation of fruit sterilisation treatments has been proceeding in co-operation with the C.S.I.R.O., and as a result the New Zealand authorities are now prepared to accept citrus fruits which have been cold stored for fourteen days at 31° F. The previous requirement was twenty-one days at this temperature. The present relaxation to fourteen days makes the proposal more practicable. Fumigation of suspect fruit with ethylene dibromide is also a possible answer to this problem and investigations are continuing.

A special fruit fly breeding unit has been built at Gosford. Citrus fruits are being artificially infested to ensure a steady volume of infested fruit necessary for the proposed tests. An improvement in routine orchard control of fruit fly also appears likely as a result of baiting and spraying tests.

Cutworms were troublesome in tableland oat crops and pastures; and following recent floods a threat developed on the North Coast. Spraying or baiting gives effective control. Aircraft were used to apply DDT in some areas to safeguard oat crops. Some reported failures were investigated and proved to be due to faulty assessment of results. Demonstrations using ground equipment have recently been carried out on the Richmond River. Efficiency of the methods was proved. The cutworm threat on the North Coast failed to develop seriously.

The Argentine Ant Eradication Campaign continued to strain the Entomological Branch resources. The pest is known only from the metropolitan area but the eradication campaign is being attempted not only for benefit in the city. One aim is to prevent the ant's establishment as an orchard pest. Some forty new areas, mainly small, were found this season; largely because of an intense publicity campaign and £5 rewards for persons first reporting new areas. Areas of infestation now total 125, covering approximately 2,300 acres. Campaign results have been very good but the work was set back by the record rains. Final eradication of this pest is confidently expected.

Treatment of banana pests distinctly advanced as a result of investigations at Murwillumbah based on the use of dieldrin. This is particularly effective against banana thrips and banana beetle borer and, unlike DDT, its use is not followed by an increase in red spider.

Red scale continued as a difficult problem for citrus growers, especially in inland citrus districts. Considerable experimental work has been conducted in the hope of developing a safe and satisfactory control programme. Organo-phosphorus insecticides such as parathion and malathion, whilst useful, have not provided the spectacular control anticipated through overseas reports; but it is likely that these materials can be fitted into oil spray programmes already developed, with advantages especially in reduction of tree and fruit injury.



Citrus Gall Wasp (*Eurytoma fellis*).

Despite the campaign an extension of this pest occurred in Sydney suburban areas, but it has not yet been recorded in commercial citrus districts.

(Photo from Entomological Branch.)

FRUIT PESTS.

Citrus Red Scale (*Aonidiella aurantii*).—Mild, wet autumn conditions were unfavourable to red scale development in coastal districts and favoured the activity of parasites and predators. Ladybird beetles, especially *Orcus chalybeus* and the golden chalcid wasp *Aphytis chrysomphali* were active and effectively kept down scale infestations.

Development of red scale in inland areas was very pronounced, especially in the M.I.A., where weather conditions largely precluded seasonal control operations. In the M.I.A. red scale infestation is worse than for many years past.

Experiments have shown the need for spray programmes involving two applications during the season, where infestation is heavy. Single sprays of organo-phosphorus insecticides, even at high concentrations, have not adequately coped with such infestations. These compounds show little advantage as scaleicides over the standard white oil sprays. Combinations of white oil with malathion or parathion at reduced concentrations offer the most promise. The improvement in automatic spray machinery has advanced the practicability of using timed programme sprays for red scale.

White Wax Scale (*Ceroplastes destructor*).—Weather conditions continued to favour this scale. No seasonal mortality due to high temperature was noted. Rain seriously interfered with control operations, but timely applications of oil sprays or parathion gave very satisfactory results. Diazinon was not sufficiently effective, and malathion in combination with Bordeaux mixture was disappointing.

White Louse Scale (*Unaspis citri*).—Very wet or flooded orchard conditions did not impede this scale, and infestation built up appreciably during autumn. Malathion in combination with spring Bordeaux mixture sprays did not provide satisfactory control, whereas parathion with Bordeaux was effective. Further work with dispersible sulphurs in combination with Bordeaux confirmed previous findings. This combination offers practical and economic advantages over the standard practice of winter lime sulphur spraying.

Purple Scale (*Lepidosaphes beckii*).—Spray treatments with parathion or oil spray, or malathion followed by oil, in combination with the October and December Bordeaux sprays against black spot, gave good control of purple scale. Single sprays of malathion or diazinon in December gave little control.

Citrus Gall Wasp (*Eurytoma fellis*).—Further extension of this pest to the western suburbs was recorded and a new infestation was reported at Matraville. Infested lemon twigs were also received from Wollongong but might not represent a new infestation centre. Careful cutting out of galls, and elimination of unwanted trees, in a defined area at Brookvale over a period of three seasons, has almost completely freed the area of gall wasp infestation. The pest has not yet been recorded in any of the commercial citrus districts.

Dicky Rice Weevil (*Maleuterpes spinipes*).—Little trouble has been caused by this pest for some years and its status as a citrus pest has declined considerably. During the past year damage showed up in a few coastal citrus orchards where it has not been observed for many years.

Citrus Rust Mite (*Phyllocoptura oleivora*).—Only occasional infestations were seen in central coast citrus orchards this season although severe injury occurred where DDT spraying had been carried out earlier. In other coastal areas infestation was commonly reported and was usually heavy. Damage occurred in north-western inland areas where this pest is only rarely seen.

Flat Mite (*Tenuipalpus californicus*).—“Shark skin” blemishing and silvering of lemons due to this mite was much more common than usual. Generally this type of injury is restricted to backyard trees, but orchard infestations were frequently reported this season. Widespread inability to apply routine pest control sprays, due to wet weather, may have influenced this phenomenon.

Queensland Fruit Fly (*Dacus tryoni*).—A large overwintering population of adult flies, and favourable conditions for development during spring, summer, and autumn, led to heavy and State-wide infestation in all susceptible fruits; and weather conditions generally militated against control measures being satisfactorily undertaken.

Many inland areas not usually troubled by fruit fly were infested, and the previous season's outbreak in the M.I.A. recurred. Late hanging valencia oranges and early mandarins and navels were infested and stung in many districts during the autumn but the attack sharply diminished in mid-April when a sudden cold change developed.

Caged tree experiments, using apples suspended from branches, showed that a formulation of malathion with yeast hydrolysate and sugar offers considerable promise as a spray bait.

A satisfactory method of mechanical implantation in citrus fruits of eggs suspended in an agar gel was developed. This method was utilized for the artificial infestation of valencia oranges used in trials with ethylene di bromide fumigation, and low temperature storage, for disinfestation of citrus fruits. Some preliminary tests of EDB fumigation under semi-commercial conditions, using a dosage of 1 lb. per 1,000 cubic feet, failed to show a complete mortality in fruit fly maggots, but gas leakages from the chamber occurred in all trials.

A series of experiments with low temperature stored fruit at 31 degrees F. plus or minus 1 degree F. for fourteen days, gave sufficient evidence to satisfy the New Zealand Government that oranges so treated could be imported safely into that country.

Orange Fruit Borer (*Isotenes miserana*).—In experiments on navel oranges conducted during late autumn and winter, TDE emulsion gave a worthwhile measure of control with one application. Sprays of dieldrin, E605, diazinon or cryolite were of little value. No increase in scales or mite infestation followed any of these treatments.

Fullers Rose Weevil (*Pantomorus godmani*).—Sprays of 0.1 per cent. dieldrin or 0.1 per cent DDT gave good control of the weevil on young citrus trees for at least one month. The effect of dieldrin in possibly stimulating development of scales or mites has yet to be determined.

Woolly Aphid (*Eriosoma lanigerum*).—Seasonal conditions favoured development of this pest, and infestations were heavier than for some seasons past. An unusual development of winged aphid occurred in mid-autumn at Orange. The wasp parasite *Aphelinus mali* was not very active. Green tip spray applications, in an experimental apple block, with BHC miscible oil (0.1 per cent. gamma), lindane (0.1 per cent.) or lindane (0.6 per cent.) in superior oil, or lindane (0.07 per cent.) at spur burst, all gave effective control.

Codling Moth (*Cydia pomonella*).—Was generally of little importance this season, and no significant information was forthcoming from experimental spray plots. It was concluded, however, that excessive infestation in some orchards during some recent seasons has not been due to any incipient resistance to DDT. Larvae are being held over the winter for DDT bio-assay tests.

European Red Mite (*Paratetranychus pilosus*).—A small infestation of this mite on plums at Orange was not further observed following measures aimed at eradication. This was the only infestation so far reported on the mainland. Consignments of Tasmanian apples coming into New South Wales were frequently heavily infested with European red mite eggs. Such consignments were directed by quarantine authorities to be fumigated with methyl bromide under plastic sheets. Small-scale experimental chamber fumigations of wrapped and unwrapped Tasmanian apples were conducted in late winter and, whilst a high percentage of hatching did not occur on either untreated apples or apples treated with methyl bromide (2 lbs. per 1,000 cubic feet per two hours), embryonic development in the eggs was observed. Ethylene di bromide (1lb. per 1,000 cubic feet for two hours) appeared to prevent embryonic development of mites within the eggs.

Red Spider (*Tetranychus telarius*).—Seasonal conditions were adverse to the development of this pest on fruit trees and no data were obtained from experiments aimed at evaluating various materials.

It was observed, however, that none of the following treatments was effective in preventing hatching of eggs of *Bryobia praetiosa* or residual enough to affect young newly-hatched mites, though the first four treatments named appeared to be effective against adult mites present at the time of spraying:—Malathion (0.075 per cent.), diazinon (0.025 per cent.), aramite (0.0125 per cent.) plus PCPPBS (0.025 per cent.), aramite (0.0375 per cent.) and lime sulphur (1/100), aramite (0.025 per cent.) and (0.0375 per cent.), or lime sulphur (1/100).

Red spider was prevalent in some areas on vegetable crops during the spring. It also heavily infested clovers in some pastures on the lower North Coast.

Green Peach Aphid (*Myzus persicae*).—DDT (0.01 per cent.) in pale oil at early to mid bud-swell gave good control of aphid on peach and nectarine, as did lindane or BHC (0.03 per cent. gamma) applied at late bud-swell to picking. Malathion (0.075 per cent.) was unsatisfactory in combination with Bordeaux mixture.

Vine Rust Mite (Calepitrimerus vitis).—Extensive browning of foliage of grape vines in Murray River settlements was caused by heavy infestations of these mites. This was most unusual.

Banana Rust Thrip (Scirtothrips signipennis).—Applications at monthly intervals in December, January and February, in combination with zineb for leaf spot control, showed that dieldrin (0.5 per cent.), DDT 0.1 per cent.), malathion (0.05 per cent.), or lindane (0.03 per cent.), all gave adequate protection of banana fruits from major, rust thrips damage. Minor, rust thrip blemish was prevalent on fruit treated with each except dieldrin. None of these insecticides except DDT had any effect on the red spider population on the leaves. DDT eliminated the predatory ladybirds (*Stethorus vagans*) for about two weeks but they remained plentiful on stools sprayed with lindane, malathion or dieldrin. Time-of-application trials, using various dusts, are not yet finalised but indicate that a definite recommendation for rust thrips control by dusting will be derived from this work.

Banana Beetle Borer (Cosmopolites sordidus).—In experiments for the control of banana rust thrips by spraying, adequate control of beetle borer was also achieved by a schedule of dieldrin sprays. None of the other insecticides used, viz., DDT, malathion, or lindane, exerted any control over beetle borer.

Ground spraying with aldrin (0.1 per cent.) and dieldrin (0.05 per cent.) in one experiment gave remarkable reduction in borer numbers over a six months' period, and these sprays were greatly superior to lindane ground sprays or the regulation cap baits. In another experiment, with known numbers of beetle borers introduced into the plots, dieldrin (0.05 per cent.) ground spray was very effective in reducing beetle numbers as determined by trapping, but aldrin (0.1 per cent.) was better than lindane (0.05 per cent.) or BHC (0.03 per cent.), or ground sprays, or 4 per cent. BHC cap bait treatment, all of which were unsatisfactory. No explanation for the variable results with aldrin in these two trials is at present evident.

Ant/Aphid Control—Attempted Bunchy Top Eradication.—With the thought that bunchy top eradication might be possible, four different types of dieldrin ground spray treatments were tested to determine their effect on heavy infestations of ants (*Pheidole* sp.) and aphids (*Pentalonia nigronervosa*) in a banana plantation. Dieldrin (0.05 per cent. or 0.1 per cent.) as high volume sprays, or (0.05 per cent. or 1 per cent.) as low volume sprays, reduced ant and aphid populations considerably. The higher concentrations for each method appeared more satisfactory. Aphid numbers declined as ants were eliminated but one month after the application of the sprays the control was not outstanding in any treatment. The need for some additional direct measures to reduce quickly the aphid numbers is indicated.

FIELD AND VEGETABLE CROP PESTS.

Australian Plague Locust (Chortioictes terminifera).—Large swarms of winged locusts which developed north and west of the Lachlan River were attacked successfully with two Tiger Moth aircraft. Approximately 6,000 gallons of 7 per cent. BHC concentrate were used.

Considerable information was gained on the migration routes used by locust swarms in the south-western areas. That information should prove of considerable value in tactical planning of control campaigns in future years.

It was established that control by aircraft has little application in closely settled areas where locust swarms tend to split and disperse. Where large swarms moving over open country are baulked in their progress by timber lines along water-courses, they present an excellent target for aircraft.

A joint project was entered into with the Victorian Department, using Dakota aircraft against winged locust swarms along the Murray River settlements. Some 200,000 acres of loose swarms were treated, mainly in Victoria, and although spectacular kills were obtained it was nevertheless difficult to assess the economic gains. Extensive damage to crops and pastures was not observed.

Using an emulsion of BHC in water, at the rate of 1 gallon per acre, a micron sprayer was tested against about 500 acres of 'hopper swarms with very good results. Providing a 3-4 chain swathe, this machine offers a fast and effective method of controlling large hopper swarms. It also appears suitable for use against swarms of winged locusts.

Army Worm (Pseudaletia australis).—Very large numbers of the caterpillars infested improved pasture and oat crops. Attack was widespread and severe throughout the central southern slopes and tablelands in October-December. Considerable damage was done to late ripening oat crops, where the larvae severed the seed stalks, causing large quantities of

grain to fall to the ground. In some cases oat crops were so thinned out as to make them not worth while to harvest. Damage to pasture was of little significance. In some areas serious loss in oat crops was averted by timely use of light aircraft equipped for spraying with DDT at from $\frac{1}{2}$ to 1 lb. per acre of the active ingredient.

Red Legged Earth Mite (Halotydeus destructor and Penthalaeus major).—These two mites were widespread and injurious to pasture, cereals, and lucerne, during the winter. Control treatments were widely applied with generally satisfactory results. Where treatments were neglected, or late, damage was sometimes serious. Experiments in the Southern Region confirmed previous findings that 4 oz. p.p.i. DDT gave effective control, equal to that obtained with the previously recommended 8 oz. rate. BHC at 2 oz. gamma isomer per acre or endrin at 3 oz. per acre gave somewhat less satisfactory control than DDT, but where BHC is applied for pasture scarab control it may also give satisfactory control of earth mites.

Pasture Scarab (Aphodius howitti).—Was present in a number of pastures in the south-western districts but was not important on the central tablelands. In control experiments, 4 oz. gamma isomer BHC per acre gave noticeably better control than did the 2 oz. rate. Endrin at 4 oz. per acre practically prevented surface activity by the grubs. In tests at Orange lindane at 5 oz. per acre and or crude BHC at 4 oz. gamma gave better results than lower dosages of these same materials.

Lucerne Flea (Smyntihurus viridis).—An infestation by this pest occurred in a 70-acre paddock at Lismore and the clover component showed serious injury. Experimental spraying showed that diazinon gave better initial kill and also residual control than did parathion at 1 oz. or malathion at 2 oz. per acre.

Black Beetle (Heteronychus sanctae-helenae).—Wet conditions in 1954-55 greatly reduced beetle populations and the 1955-56 damage was insignificant. Weather conditions having continued to be unfavourable, no damage is likely to occur during the coming season.

French Bean Fly (Agromyza phaseoli).—Very light infestation by bean fly occurred this autumn, and experimental findings were not particularly significant. DDT (0.025 per cent.), dieldrin (0.015 per cent.), diazinon (0.01 per cent.), parathion (0.0125 per cent.), or lindane (0.02 per cent.), all gave good control of bean fly. They also exerted some control over bean blossom thrips (*Taeniothrips usitatus*), by comparison with the check plots.

Tomato Caterpillar (Heliothis armigera).—In an experiment in an autumn crop of tomatoes, programme sprays of different insecticides and miticides in combination with Bordeaux mixture were evaluated as follows:—

1. 0.05 per cent. DDT dispersible powder did not control tomato caterpillar as well as did the emulsion form of DDT at this concentration.
2. A combination of 0.025 per cent. DDT with 0.02 per cent. malathion was less effective than was DDT emulsion at 0.05 per cent.
3. Routine applications of DDT emulsion in combination with weak Bordeaux mixture plus shirlan caused no phytotoxic effects on tomato plants.

Green Vegetable Bug (Nezara viridula).—Very heavy infestation by these bugs built up late in the summer. They attacked bean, tomato, maize, and lucerne seed crops. An unusual occurrence was reported from the M.I.A., where apricots and peaches were infested and some fruit blemishing occurred. Following flooded conditions in one district, large swarms of bugs in the autumn moved into citrus trees where they sheltered.

VETERINARY AND MEDICAL PESTS.

Queensland Cattle Tick (Boophilus microplus).—An eradication campaign against this tick was commenced in January, 1956, in the Kyogle and West of the Richmond Range areas. This campaign is being conducted in districts which include areas where arsenic resistant ticks were found in June, 1952. The subsequent appearance of resistant ticks west of the Richmond Range was responsible for a decision to use rucide in some 400 dips.

One engorged female tick was found on a sale calf at Grafton in May, 1956, and this prompted the collection of additional ticks in case the identified tick came from outside the recognised infested areas.

Experimental fumigation trials were continued in co-operation with Queensland authorities and it was demonstrated that $\frac{1}{2}$ lb. ethylene dibromide, for four hours exposure in a chamber, was lethal to the various non-parasitic stages of *Boophilus*. Methyl bromide at a dosage of 2 lb. for four hours killed larvae but the eggs survived.

Sheep Blowfly (*Lucilia cuprina*).—Larval implant trials were conducted to test the merits of a range of insecticides under different methods of application. Diazinon, dieldrin, aldrin, and BHC were tested in jetting and in low and high volume spraying techniques. Results indicated the superiority of diazinon over the other materials, particularly in the lower or more economic concentrations. Jetting was superior to spraying.

In field practice, dieldrin and aldrin have been widely used for sheep blowfly prevention at concentrations of 0.05 per cent. and 0.1 per cent. respectively, but the recent suggestion is that a concentration of 0.025 per cent. dieldrin may be a satisfactory strength for treatment of sheep.

Sheep Ked (*Melophagus ovinus*).—Many inquiries are received concerning the value of aldrin and dieldrin for lice and ked control.

Dieldrin is being prepared as a dip for use at 0.0125 per cent. concentration. In a fogging test conducted in October, 1955, a mixture of BHC (2.2 per cent.) and dieldrin (1.1 per cent.) gave a high degree of ked control within 48 hours. After four weeks no adult ked was seen but five pupae, three of which would possibly have hatched, were found.

Stable Fly (*Stomoxys calcitrans*).—These flies were abundant and very troublesome during the autumn, and several insecticides were tested as protectants of stock against attack. Pyrethrin and piperonyl butoxide was not effective when cows were sprayed twice daily. Kix and cragg, two fly repellants well known overseas, or malathion 0.1 per cent. gave no satisfactory protection.

House Fly (*Musca domestica*).—Diazinon (1 per cent.) incorporated in a dry white sugar bait was tested successfully against house fly in a piggery, at the rate of 1 lb. per 5-6,000 square feet of floor. Daily application over a two-week period reduced flies to negligible numbers even though the deep litter system of pig raising provides ideal conditions for fly breeding. Spraying the breeding areas with 1 per cent. diazinon had the immediate effect of eliminating larval development and fly emergence in bull pens.

TIMBER PESTS.

Termites (*Coptotermes lacteus*).—Observations are being continued in an experiment, largely designed by the Division of Wood Technology, Forestry Commission, in which treated timber blocks are inserted about termite mounds at Lisarow. The insecticides dieldrin, chlordane, creosote, dichloroethyl ether, sodium pentachlorophenate, pentachlorophenol, BHC, and lindane have been tested. Dieldrin and chlordane appear to be providing the greatest degree of protection so far. Experimental termite protection and eradication treatments are being conducted in a number of private buildings in the metropolitan area and on some Departmental experiment farms.

FLOUR PESTS.

***Tribolium* spp. and *Rhizopertha dominica*.**—Large consignments of flour packed for export were rejected at the wharf because of flour beetles on the outside of the bags during late summer. Second-hand bags, infested rail trucks, and dirty wharves were suspected as sources of infestation but inspections did not confirm this. Examination of mill and flour storage premises indicated possible sites of initial infestation. A committee comprised of members of this Department with C.S.I.R.O., and Department of Primary Production, Wheat Board, and Flour Millers' Council representatives, has considered the most effective methods of improving the protection in flour mills.

WEED PESTS.

Crofton Weed Stem Gall Fly (*Procecidochares utilis*).—This fly has now established itself on crofton weed in many areas, especially on the far north coast, but unfortunately it is heavily parasitised by wasps. Difficulty has been experienced in developing numbers of adult flies from field-collected breeding material, and in some cases more wasp parasites than gall flies have been developed.

St. John's Wort Beetle (*Chrysomela quadrigemina*).—This insect is well established in some large areas of St. John's Wort in the Orange district, and larvae were very active in late winter and early spring. Adults were plentiful in November and December.

HOUSEHOLD PESTS.

Ants.—Over 3,000 specimens of ants were examined during the year as a result of Argentine Ant Campaign publicity. The numbers were highest in January, February and March, 1955 and tapered off in the cooler weather. The most common ants were *Pheidole megacephala*, *Technomyrmex albipes* and *Tapinoma minutum*. The warm and extremely wet conditions in summer, especially February, were largely responsible for the high incidence of ants infesting homes.

Argentine Ant (*Iridomyrmex humilis*).—To obtain a rapid and relatively complete survey, especially of the metropolitan area, it was decided to step up publicity so that as many people as possible would be aware of the desirability of submitting specimens. A reward system was introduced, and brought a remarkable response from the public.

As a result, forty new areas of infestation were notified, and preliminary survey indicated that they covered some 350 acres. These areas range in size from a house block up to 25 acres. Infestations were found for the first time in the municipalities of Concord, Fairfield and Manly. It was possible to spray only nine of these areas completely and to part-spray three of them, because of labour shortages and wet weather.

The total number of infestations now amounts to 125, covering about 2,300 acres.

An attempt was made in February-March, 1956, to check survey the eighty-four areas covering 1,950 acres sprayed prior to November, 1955, but due to bad weather only 51 areas covering 1,400 acres, were sprayed. One or more ants were found on forty-three of the 5,185 properties surveyed, i.e. 8 per cent. showed infestation. The original eradication experiment area in Platform-street, Lidcombe, was surveyed for the sixth time without finding any Argentine ants.

ENTOMOLOGICAL COLLECTION.

The following groups have been sent to specialists for determination: *Braconidae*, *Dytiscidae*, *Gyrinidae*, *Hydrophilidae*, *Haliphidae*, *Noctuidae*, *Aceridae*, and *Coccidae*.

Groups which have been named and returned included *Grylloidae*, *Trogidae*, *Dytiscidae*, *Gyrinidae*, *Hydrophilidae*, *Haliphidae* and *Formicidae*.

Re-arrangement has been made in the *Belastomatidae*, *Trogidae*, *Nitidulidae*, *Microhymenoptera*, *Tenthredinidae*, *Formicidae*, and *Muscoidea Acalyptata*, and much of this material was transferred to the unitary system.

A considerable amount of time was devoted to the *Formicidae* and all named specimens were arranged according to the classification proposed by J. J. McAreavey, who named large numbers of specimens forwarded to him.

Four new ten-drawer cabinets were received, and have facilitated the orderly re-arrangement of the collection.

Chemist Branch.

CEREAL SECTION.

1955 Crop Year Wheat Quality Problems.—In September it appeared that record yields would be obtained in some areas, particularly northern areas. Unusually heavy rainfall in October changed the outlook for record yields, and also for grain quality. It was soon apparent that millers would almost certainly find difficulty in securing sufficient high quality grain for their requirements, and that the quality of F.A.Q. wheat would be affected.

The grain ultimately received as F.A.Q. wheat from the 1955 crop is not directly comparable with F.A.Q. wheat from the previous year, because northern wheat was excluded from the 1955-56 F.A.Q. This was so that it could be available to fulfil special contracts, for wheat of specified minimum protein content.

F.A.Q. wheat for 1955 showed a significant decrease in protein content compared with F.A.Q. wheat from the 1954 crop; 9.3 per cent. as against 11.5 per cent.

As the harvest approached, it was apparent that millers would need to compromise in their purchases of high quality premium wheat, and accept some grain that would be under quality in characters other than protein quality and protein content. Many inquiries were received from millers early in the wheat season, as to the extent to which factors other than protein quantity and protein quality would be sacrificed in an effort to meet the demand for high protein flour. In those circumstances it was gratifying that millers were able to purchase significant quantities of premium wheat. The demand was highly competitive and a larger quantity would undoubtedly have been purchased had it been available.

From the 1955 crop, 4,177,224 bushels of wheat were purchased at a premium above the F.A.Q. price, compared with 4,040,555 from the 1954 harvest. Premiums paid ranged to 3s. 9d. per bushel above the F.A.Q. price. The premium average was 18.91 pence. The total of premiums paid was £329,207. The 1954 crop premium figures were respectively 3s. 8d., 21.11, and £355,494.

Cereal Quality Control Work.—Three hundred and three samples were examined for provision of export flour certificates; compared with 507 in 1954-55. The decrease reflected the condition of the flour export market. Many of the samples represented relatively small tonnages exported on behalf of private firms. Some were for wheaten products other than flour, such as semolina.

Reflecting a highly competitive export market, some products had to conform with contractual specifications. Every assistance was given to exporters to meet these requirements. As previously indicated, wheat from the northern areas was not included in the F.A.Q. It was reserved to fulfil contracts of specified protein content.

After the harvest, representative samples from northern grain elevators likely to contain wheat that would meet the requirements in respect of protein were tested. Subsequently, when wheat from the selected sites was forwarded to the Terminal Elevator a representative sample of the consignment was analysed to determine whether it would comply with the standard. Sufficient wheat of the required protein content was obtained to meet the requirements of the contract allocated to this State.

Salvage of wheat to a specified protein content is a major departure from the F.A.Q. system of marketing grain. In effect it represents the introduction of wheat grading, although as yet individual growers do not receive direct advantage from producing wheat that meets these particular specifications.

Forty-two samples of flour (fifty-six in 1954-55) were examined on behalf of the Department of the Navy, as to whether they complied with particular specifications and were suitable for use at home stations and for shipment overseas on behalf of the Royal Navy and the Royal Australian Navy. Examination of the samples determines the suitability of the flour for bread making, and for keeping quality under conditions as exist in ships. The Department of the Navy is notified and the mill concerned is assisted to rectify defects.

Sixty-four samples of flour (fifty-three in 1954-55) were examined for various Government institutions, as to suitability for bread-making. Quality of the flour supplied to the institutions has been satisfactory. No major complaint arose from the samples examined.

Cereal Instruction and Advisory Work.—With continued restricted demand for export flour the local market continued highly competitive, with millers increasingly interested in improved facilities for flour quality control. To an extent, expansion of laboratory facilities in flour mills has been restricted by uncertainty but, increasingly apparent, improved flour quality seems now to be more important than increased output. The need to improve export flour quality, in some instances to meet contractual specifications, has helped to stimulate millers' improvement of laboratory facilities.

Requests during the year sought information regarding type of equipment best suited for particular purposes in flour quality control. These requests have been met, and demonstrations have been arranged for bodies concerned.

The competitive wheat classes at Sydney Royal Show and country shows continued to interest farmers as an indication of why their wheat is placed in particular classifications for commercial use. Two officers of the Chemist's Branch acted as judges in the wheat section at Sydney Royal Show in 1956, and one acted as judge of wheat at Narrabri Show. The general standard of wheat exhibited reflected the conditions under which the crops had matured in the field; the overall standard of entries was lower than that of previous years.

With less demand for Australian wheat on overseas markets, farmers in areas from which wheat is sought at a premium above the F.A.Q. price are anxious to offset any decline in world price by producing grain of premium quality. They are anxious that the demand for premium wheat should be maintained and extended, and they support research and advisory services accordingly.

"Starch Reduced" Flour.—The question of the standard set under the Pure Food Act for protein content of flour used in the manufacture of "starch reduced" bread has been subject of conferences with the Department of Public Health and representatives of the various sections of industry producing "starch reduced" bread. It may be possible, by adding gluten to flour, to meet the demand for "starch reduced" bread if the current standard is retained, but it is considered

that a satisfactory loaf could be produced if the standard for minimum protein content was reduced slightly. Thus the basis on which the demand for premium wheat has been established could be retained.

The suitability of particular wheats for milling into "starch reduced" flour, and the areas from which such wheats are likely to be available, have been subject of enquiries from millers; and further representations are likely to be made to the Department of Public Health to revise the standard for protein content of "starch reduced" flour.

"Wheat Grading"—Consignments of wheat of specified minimum protein content have been shipped from the State, a definite departure from marketing wheat as F.A.Q. grain, and it is now generally agreed that grading of wheat is desirable.

A committee consisting of Departmental officers and the Chairman of the Grain Elevator Board has considered grading and has recommended that in the northern portion of the State wheat should be segregated into two grades, on the basis of quality of the grain on receipt at country elevators. It has been recommended also that individual growers whose wheat is classified in the higher grade should receive the advantage of any additional price received in respect of that particular portion of the crop.

If it is found practicable at country elevators, to isolate higher quality wheat, further investigations will be necessary to determine the most satisfactory basis for segregation.

Mill Room Operations.—644 wheat samples were received; 700 were milled—66 for plant breeders, 322 for experiment farms, 66 for farmers, 243 for silos, 42 for the R.A.S., and 61 miscellaneous; and 700 wheat bushel weight determinations were made. The 767 moisture determinations made included wheat, 701, maize 49, and rice, 17.

Milling Tuition.—Tuition on milling was given to the cereal technician appointed to the Agricultural Research Institute, Wagga. The mill plant was used for various projects, including a demonstration of the practicability of grinding and grading casein. This was occasioned by an adverse report from abroad on the quality of casein exported. A demonstration and a discussion of milling were given to students attending a Sydney Provender Milling course of instruction.

Advice has been given to firms engaged in the wheat industry. Requests for information were very diverse and included such items as special binding ingredients for dog biscuits, and production and quality of wheat germ for export. An officer of the Commonwealth Department of Agriculture discussed flour enrichment.

Many scholars have been helped with advice, pamphlets and samples for school "wheat projects". Entries in the R.A.S. wheat competitions were milled and judged.

Gluten Survey Maps.—The gluten survey maps of the Silo wheats have been prepared; and a new departure has been the making of histograms and scattergrams of the Silo wheat gluten quantity and quality.

R.A.C.I. Commonwealth Collaborative Survey.—Our part in the Cereal Section of the Survey was carried out. This involved bread making to a standard formula, with strict conditions of procedure.

Stock Foods and Medicines Act, 1940.—Thirty-three samples were taken, and examined under the provisions of this Act. Each complied with the stated label contents and there was no call for analysts' certificates as a prerequisite for prosecution of any manufacturer.

DAIRY CHEMISTRY SECTION.

Dairy Factory Advisory Service.—It proved impracticable to appoint a dairy chemist to implement this service.

Butter Analysis.—Twenty-seven competitive samples of butter in the Dairy Produce Section of the Sydney Royal Show were analysed for salt and moisture content; some failed to meet specified requirements. Analyses of eighteen samples of butter from the N.S.W. Division, Annual Conference of the Australian Institute of Dairy Factory Managers and Secretaries revealed a few samples below minimum requirements.

Testing of Dairy Glassware.—All dairy glassware testing and branding facilities have been transferred to the Weights and Measures Office. Suitable training was arranged for the officer taking up duty.

Up to the time of transfer, 8,877 items of glassware had been tested; 3,211 cream flasks, 3,047 milk flasks, 840 thermometers, and 1,779 pipettes. Rejects were 3.4 per cent. of cream flasks (mainly glass defects), compared with 1.5 per cent. in the

previous financial year; 14.9 per cent. of milk flasks (mainly volume errors), compared with 16.5 per cent. in the previous year; 27.9 per cent. of thermometers (broken columns and incorrect 100 degree marks), compared with 56.8 per cent. in the previous year; and 9.05 per cent. of pipettes (faulty orifice diameters), compared with 4.4 per cent. in the previous year.

WATERS SECTION.

General Water Analyses.—548 samples of water were analysed, and recommendations made as to their suitability for agricultural pursuits; 235 on behalf of the Water Conservation and Irrigation Commission. Numerous enquiries in connection with water supplies, purification, etc., were dealt with, apart from the foregoing 548 samples for general analysis.

Fluorine Analyses.—All samples of water submitted by the W.C. and I.C. are examined for fluorine content. With few exceptions the fluorine content was below the level considered harmful to cattle and sheep.

Water Resources Symposium.—Officers of this Branch attended the Symposium on "The Water Resources of Australia, Their Control and Development" sponsored by the N.S.W. University of Technology. Out of this symposium has arisen the "Water Research Foundation". The Branch will follow keenly the development of the Foundation, and will make facilities available to further it.

Waters Suitability Questionnaire.—A start was made on checking with landholders their results and experiences of using water, tested by the Branch, in comparison with the opinion as to suitability expressed by the analyst at the time of testing.

The check-up is taking the form of a questionnaire in which the Branch is seeking information with respect to both irrigation and stock usage. Replies, to date, indicate that the opinions and advice expressed by the analyst are highly regarded.

It is intended to collate information from the replies, with the present standards used to formulate the analyst's reports, to determine whether modifications of these standards are desirable.

Selection of Bore Site, Western Division.—In September, 1953, a bore site on the Wilcannia-White Cliffs stock route was selected 31 miles from Wilcannia. The following predictions were supplied to the Pastures Protection Officer:—Depth 290 to 300 feet, total salts 400 to 450 grains per gallon, supply 600-700 gallons per hour.

Boring was recently completed. The actual site was moved some distance in the direction of White Cliffs, for utilitarian reasons, but comparison of predicted and actual figures:—Depth 315 feet, total salts 420.6, supply 800 gallons per hour, is still of interest.

Water Supply Problem at Bombala.—The senior chemist visited Mila, *via* Bombala, to investigate a water supply problem in utilisation of spring waters occurring in slate and granite country at the headwaters of a tributary of the Snowy River. Analyses of the spring waters, including fluorine determination, are proceeding. An interesting point about the soils in this area is the occurrence of considerable peaty soils along creeks such as Jackson's Bog. Burning off of tussocks often results in these soils catching fire and burning over large areas, until the fire is extinguished by flooding from creek diversion.

M.I.A. AGRICULTURAL CHEMIST.

The officer appointed as M.I.A. Agricultural Chemist, in 1954, continued working at head office of the Chemist Branch, pending facilities at Yanco Experiment Farm.

Citrus Quality Investigations.—Investigation of poor quality in M.I.A. oranges continued, in co-operation with the C.S.I.R.O. Division of Food Preservation, Homebush, the C.S.I.R.O. Irrigation Research Station, Griffith and the Yanco Experiment Farm.

The first year's study of fruit development has suggested that excessively thick skins result from a secondary growth of peel during the winter, after the main growing period, as well as inhibition of growth of carpellary tissues earlier in the season. Further physiological studies are in progress.

Considerable evidence now indicates that phosphorus deficiency is a major contributor to poor citrus quality in the M.I.A. However, other controllable factors, such as nitrogen nutrition might also affect quality. Potassium level in the trees under study is not correlated with fruit quality indices, but is related to fruit size.

Superphosphate applied to the soil caused slight but significant, improvement in leaf phosphorus content and fruit quality. Application of phosphates as foliar sprays is now being tested, in the hope that this method will supply phosphorus to the tree more effectively than does soil application.

PESTICIDES SECTION.

Extension Work.—Many inquiries are being received from farmers anxious to take advantage of newer pesticides; in particular concerning the safety of using mixtures of these sprays, for economy of application.

Pest Destroyers Act and Stock Foods and Medicines Act.—With a host of formulations on the market it is inevitable that products which fail to come up to the manufacturer's specifications are marketed. Following complaints, analyses are conducted. Under the above Acts, and where justified, legal action is taken.

Projects Involving Pesticides Residues.—Whenever toxic chemicals are used in the food-producing industries to control pests, the possibility of harmful residues on food arises. Investigations were as follow:—

- (a) *Arsenic and Lead Residues on Apples.*—In association with the C.S.I.R.O. Division of Food Preservation and Transport an efficacious method for removing excess lead and arsenic spray residues from apples was sought. It was found that with thorough rinsing there is little risk of fruit injury following cold washing with 1½ per cent. hydrochloric acid. Five minutes' washing in 1 per cent. "M3" (a mixture of sodium metasilicate, trisodium phosphate and "teepol", a sodium higher alkyl sulphate) was the most promising alternative to the acid wash, and where white oil had been used in the spray programme, it was more effective than the 1½ per cent. acid. Further work is contemplated, using heated solutions of "M3" and organic wetting agents.
- (b) *DDT Residues in Milk Products.*—Investigations continued to determine the toxicity hazards in milk products from dairy cattle subjected to DDT dips to control the cattle tick in northern N.S.W. Since much of the milk is processed into butter, this product has received particular attention. During the first phase of the current tick eradication campaign, samples of factory processed butter are being studied after each dipping "round".
- (c) *Mercury Residues on Apples.*—Investigations are in hand to establish whether toxic residues of organic mercurial fungicide sprays are retained on fruit. Health authorities agree that marketed food should contain no mercurial residue.

BHC Stocks for Grasshopper Control.—Large stocks of BHC left from previous campaigns were examined for usability against a plague expected in October, 1955, in the south-west. They were later used in a successful campaign against the pest.

Analytical Methods Research.—Research into the development of new and modified existing methods of analysis of pesticides continued, especially with regard to micro-methods for determining spray residues. It is thought that new chromatographic techniques will be helpful.

Chlorinated Hydrocarbons; Insecticidal Studies.—An officer of the Chemist Branch is working at the N.S.W. University of Technology, on pesticide formulations used in the control of cattle tick in N.S.W.

One particular formulation has been found to be a mixture of a synthetic soap and DDT, and when melted and poured into water it forms a colloidal suspension of DDT. This colloidal suspension soon aggregates to form large crystals which deposit on the bottom of the dip and are lost to practical dipping.

Some interesting data have been accumulated in regard to the effects of salts, clays, and soils on the stability of this DDT suspension. The information obtained for this formulation, which is being used in the current tick eradication campaign, will be very useful in "screening" other formulations that may be used later.

Analysis of Aerosol Formulations.—Aerosol formulations covering a multitude of products including insecticides are proving very popular overseas. In short time they may be on the Australian market in all their diversity.

This type of product usually consists of the active ingredient dissolved in a solvent together with a liquefied gas, commonly Freon. It is in a specially designed canister to withstand a pressure of anything up to about 10 atmospheres, and

fitted with an orifice controlled by a valve. A very fine dispersion of the formulation is achieved when the liquefied gas is released through the small orifice.

Sampling of these products for chemical analysis presents difficulties. However, as a result of experimentation, a simple and efficient method of sampling has been evolved by the Chemist Branch, in anticipation of future needs.

SOIL SURVEY UNIT.

Two senior surveyors of the unit resigned to join the C.S.I.R.O. Division of Soils. One graduate surveyor has just joined the unit as a replacement. Three soil survey assistants of Intermediate or Leaving Certificate Standard were recruited and are undergoing the necessary training.

Soil Survey Field Work.—A detailed survey of "Moobong" Estate (3,000 acres) in Jemalong Irrigation District, was carried out for War Service Land Settlement.

A soil survey of part of Tamworth Experiment Station was carried out. The soils were found to be not representative of those in the surrounding district.

Laboratory Work and Compilation of Reports.—This occupied most of the unit's time in the past year because of an accumulated lag of samples and reports requiring attention—

- (a) *Murray Downs Estate.*—Analyses for salt were carried out on 600 samples. In addition, 150 profile samples were analysed for exchangeable bases, organic carbon, total nitrogen, total phosphate and mechanical analysis. The report and soil map of this estate have been completed.
- (b) *Warrawidgee II Estate.*—Analyses for exchangeable bases, total phosphate, total nitrogen and carbonate, and mechanical analysis were carried out on 150 samples. Analyses are now complete, and the report will shortly be completed.
- (c) *County Cumberland.*—The pedological bulletin has been written and is in the hands of the publishers. The soils section of the land use report has been completed and the bulletin will be published when the land use history and planning section and the agronomic section have been completed.
- (d) *Special Surveys begun in 1955.*—The deep boring traverses begun at Cararbury (Billabidgee area) and Warrawidgee have been completed. A paper has

been written, and submitted to the Journal of the Royal Society of New South Wales. The detailed study of terraces and terrace soils, done as part of the County Cumberland survey, was also made the subject of a technical article. This article has been submitted to the Royal Society of New South Wales for publication.

PLANT NUTRITION SECTION.

Prune Nutrition at Young.—The nutrients, nitrogen, phosphorus, potassium, magnesium, calcium, boron, copper and manganese have been studied in prune leaves collected by the district fruit officer at Young, over a growing season. Approximately 300 analyses have been completed. There are very few references in literature to the mineral content of prune leaves. Thus the results will provide a most useful reference.

In the Young district prunes were planted after the 1914-18 War, by soldier settlers. In the interim scant attention has been paid to the fertiliser requirements of the trees. The analyses have indicated that the prune trees will respond to increased applications of nitrogenous and phosphatic fertilisers at least. Based on the analyses and past fertiliser practices, field trials involving rates of N.P.K. and the minor element boron are expected to provide data on which to revise the present fertiliser recommendations.

Apple Nutrition at Penrose.—A study on the mineral nutrition of apples grown at Penrose continued. Based on the study of uptake and movement of minerals, suggestions as to fertiliser usage have been made.

Responses to the fertilisers have been observed over the last three years, in respect to the health and vigour of the trees and their production. The particular orchardist claims that a multiple increase in production, in the order of 300 per cent. to 400 per cent. over his entire orchard, has been a direct result of his new fertiliser practices. This year some 200 analyses have been completed in this project.

Potash Requirements of Apples.—This project has application to the State in general but particular reference to the M.I.A.

"Apple Measles".—This condition has been a problem in New South Wales. Overseas it is accepted that boron applications are the cure, but dressings of borax have failed to



Plant Nutrition Survey.

The Chemist Branch, and the Pastures Section of Division of Plant Industry continued the pasture plant nutrition survey involving plot trials in forty-five areas.

The respective superphosphate, sulphur, molybdenum and lime affects have been of particular interest.

(Photo from Chemist Branch).

correct the symptoms here. The problem is now under investigation; including a study of the mineral content of the leaves, bark, wood and twigs of affected trees.

Glasshouse Studies.—The Chemist Branch glasshouse at Hawkesbury Agricultural College was completed in 1955. Experiments were initiated in the autumn of 1956, on soils collected from Pitt Town, Walcha district, Capertee, Taree and Yarrawitch. The projects are co-operative between the Division of Plant Industry and the Chemist Branch. They are concerned with potassium, lime, nodulation, and molybdenum.

Extension Service in Plant Nutrition.—Field days, meetings and short-term schools for farmers are making increasing demands. With these in view a valuable collection of plant nutrition slides (35 m.m.) has been compiled, as extension aids, by plant nutrition analysts.

The Chemist Branch co-operated with the Division of Plant Industry, and the Biological Branch, in preparing a display of clover plants, grown in boxes, showing fertiliser and nodulation responses. These boxes of clovers were exhibited at the 1956 Sydney Royal Show, and again at the Sheep Show in June, 1956. The displays at the Sheep Show and the R.A.S. were miniature replicas of some detailed field experiments prepared by the plant nutrition group. Staff were in attendance for discussions with interested people.

Grasses, Nutritional Value.—Protein analyses have been regularly carried out, on grasses and clovers grown in many parts of N.S.W. The Division of Plant Industry is constantly seeking and testing new pasture species. Samples are analysed for protein at various stages of their growth. Nitrogen determinations have been important in this search for high protein producing plants in or to suit the agricultural districts of N.S.W.

Plant Nutrition Publications.—Eight or more articles have been published or prepared during 1955-56. Each member of the plant nutrition unit has contributed.

RADIO-ISOTOPE TRAINING.

Radio-isotope techniques are being rapidly developed as an invaluable aid to the chemist in his study of agricultural problems. Arrangements have been finalised with N.S.W. University of Technology authorities for an officer of the Chemist Branch to be trained in radio-isotope methods and their practical application to agricultural problems.

MISCELLANEOUS ANALYSES, ETC.

Leaf Analyses for Salt.—Large numbers of leaf samples are analysed annually for salt. Field officers, particularly in the M.I.A., constantly require salt determinations in their diagnoses of crop deficiencies and toxicities.

"Basic Superphosphate" Studies.—Laboratory studies on the pH changes occurring in basic superphosphates and the best method of estimating the pH of such superphosphate mixes is nearing completion. The tendency for basic superphosphate to cake on mixing and standing has been studied and conclusions have been reached.

Nitrogen-Lime Mixtures.—Loss of nitrogen in the form of ammonia from nitrogenous-lime mixture is being examined. The nitrogenous fertilisers studied were:—

- (i) the salt of a weak base and strong acid—ammonium sulphate,
- (ii) fowlward manures and the liming materials, hydrate of lime and carbonate of lime.

Mixtures employing gypsum and superphosphate have also been included.

pH Field Testing Kit.—Work is progressing towards a suitable kit. Several thousand results obtained by ten promising indicator solutions and papers have been determined and compared with the standard glass electrode method.

Versenate Titrations.—Work is progressing on a method for determining calcium and magnesium in plant material by the versenate titration method.

Flame Photometry.—Determination of potassium and sodium in plant material by the flame photometry technique is being studied.

Soil Samples from Field Officers.—Throughout the year soil samples have been analysed for field officers, including many from various rotation experiments.

Wine Grape Analyses.—Samples of grapes submitted by Division of Horticulture were examined for acidity and sugar content. Low acidities and high sucrose contents were found in specific samples from a trial area at Molong, N.S.W.

Apple Wrappers.—The fat content of imported apple wraps from various sources were determined for the Division of Horticulture. Correct impregnation of the wraps by a suitable quantity of an oil or fat is critical to the incidence of incipient scald of Granny Smith apples in cold storage.

Pineapple Maturity Tests.—Random tests on consignments of Queensland pineapples revealed a considerable quantity to be immature, unsuitable for the market.

Honey-Zinc Content.—Samples of honey were analysed for zinc content. Only small amounts of zinc were present.

Coral Sand from Lord Howe Island.—Coral sand is used as ballast in ships coming from Lord Howe Island to Australia. This coral sand was analysed at the request of the Division of Animal Industry with a view to determining its suitability as poultry food. The coral sand is practically pure calcium carbonate and on a chemical basis it should be quite useful as a source of calcium for poultry.

Analysis of Meat Meal for Wagga Abattoir.—A further sample of meat meal was analysed for moisture and fat content for the Wagga Municipal Abattoir. The percentage of fat was slightly higher than usual.

Conversion of Sewage Waste to Fertiliser.—Enquiries have been received from a large country town as to the commercial possibilities of converting the sewage waste to fertiliser. This waste has a manurial value approximating that of animal manure so far as nitrogen and phosphorus are concerned, but is almost invariably deficient in potash. References were given (to British and American publications) on the subject, together with advice to contact the Health Department for views on health hazards.

COMMITTEES AND CONFERENCES.

The Chemist Branch was represented in the following committees: Wheat Advisory Committee, Plant Nutrition Committee, Pest Destroyers Act Committee, Veterinary Medicines Act Committee, and Soil Survey Advisory Committee.

The Branch was represented at the Australian Plant Nutrition Conference, the Mildura Citrus Growers Association Conference, the Water Resources Symposium, and others.

AWARD OF THOMAS LAWRENCE PAWLETT SCHOLARSHIP.

Mr. R. R. Storrier, an officer of the Soil Survey Unit, was awarded the Pawlett scholarship for post graduate studies. He is now in the United Kingdom carrying out work in the field of soil mineralogy at Rothamsted Experiment Station. This is the second year in succession that the above scholarship has been awarded to an officer of the Chemist Branch.

Mr. B. G. Davey, who received the Award last year is at present studying with Dr. R. L. Mitchell of the Macaulay Institute for Soil Research, Scotland, a world authority on spectro-chemical techniques.

Botanist Branch.

BOTANIC GARDENS, NATIONAL HERBARIUM AND ALLIED ACTIVITIES.

The Branch reports mixed degrees of satisfaction with its varied activities during the year. Marked progress was made in botanical research, and many valuable additions were made to the living collection of plants, but on the other hand considerable difficulty was experienced in maintaining at a reasonably high level the various areas under control, mainly because of abnormal weather, staff shortages and equipment.

The year was marked by alienation of land, for purposes other than park lands. A large area in the south-eastern corner of the Domain was leased to the City Council to provide a car-parking station, and further areas in the Inner Domain near Macquarie Street were set aside for the construction of the Circular Quay roadway and Eastern Express Highway.

Details of sectional activities are as follows:—

BOTANIC GARDENS AND DOMAIN.

The rainfall was 79.65 inches, 34.85 inches above average. The particularly heavy summer rainfall caused abnormal grass and weed growth. Staff shortages aggravated the position. For economy it was agreed not to fill a number of vacancies. At 30th June, 1956, there were eighteen vacancies. Such

labour shortage, combined with a reduction in the effective working hours owing to wet weather, caused many maintenance problems.

Inadequate equipment, particularly in regard to tractor mowers, underlined the difficulties.

Even so, some improvements were made to the grounds, including the addition of two new shrubberies containing over fifty species many of which were not previously grown in the Botanic Gardens. Through exchanges a number of other plants which were new for our collections were established in various parts of the Gardens. All ferns growing in the shade-house were identified and labelled for the first time.

Commemoration of the Royal Visit.—A Commemorative Wall was erected at Farm Cove to mark the landing site of the Royal Visit in 1954. The Wall was unveiled by His Excellency the Governor-General, Field Marshal Sir William Slim on the second anniversary of this historic event.

Memorial trees planted in the Botanic Gardens and at Government House by Her Majesty, Elizabeth II and the Duke of Edinburgh, have made satisfactory growth.

Annex to Botanic Gardens.—Reconnaissance visits were made to a number of areas within the County of Cumberland to determine their possibilities as annexes to the Botanic Gardens. An officer of the Cumberland County Council assisted. Areas visited were in the following districts:—French's Forest, Oxford Falls, Middle Creek (Narrabeen), Mona Vale (Inglewood), Kuringai Chase (Belrose), St. Ives, North Ryde, Landsdowne-Bass Hills, Cabramatta, Prospect, Rookwood-Chullora, North Wahroonga Plateau, Old Man Valley (Hornsby), and two sites at North Rocks.

Census of Plants in Botanic Gardens.—The complete census of living plants in the Botanic Gardens is nearing readiness for submission for printing. This list will include all plants in the outdoor portions of the Gardens and those on display in the glasshouses and shade-house.

Landscape Gardening Service.—Mr. A. Wilson, the Landscape Gardener, was granted a year's leave of absence and left for Europe in early August, 1955. Before his departure he visited the Metropolitan Water and Sewerage and Drainage Board grounds at the Prospect Reservoir and advised on a planting scheme for the area. Since August, 1955, a restricted landscaping advisory service has been undertaken by Mr. A. Correy. Plans and advice were provided for the Manilla (N.S.W.) Rotary Club's Rest Park and Children's Playground, and for the Gunnedah War Memorial Swimming Pool surrounds. In the metropolitan area, the Sutherland Shire Council, Qantas Air Terminal at Kingsford Smith airport, St. Paul's College at Sydney University, and Riverview College were visited for advisory purposes.

Spraying Activities.—The programme was maintained as well as possible, considering the difficult weather. Control of lace-bug was incomplete and heavy infestations developed on Azaleas. Control of scales (hard, soft, and wax) was well-maintained, and infestations of annuals by aphids and other insects were kept under control.

Root Rot of Shrubs and Trees.—Root Rot has been prevalent in many beds during and since the excessively wet summer, and some shrubs and trees have been lost. Many others are showing effects and may ultimately be lost. The species so far effected include *Quercus virginiana*, *Quercus agrifolia*, *Eucalyptus sideroxylon*, *Rhododendron indicum*, *Rhododendron hybrids*, *Cassine maurcenica*, *Arbutus unedo*, *Rondeletia amoena*, *Clerodendron ligustrinum*, *Thryallis glauca*, *Phebatium squamulosum*, *Cytisus* sp., and *Podocarpus* sp.

In most cases the casual organism was *Armillaria mellea*, which formed aerial fructifications on nearly all specimens infected. In the oaks (*Quercus* spp.) the casual organism was *Phytophthora cinnamomi*.

Glasshouse Activities.—The glasshouses provided colourful displays of decorative plants, including Gloxinias (*Sinningia* spp.) *Caladium*, *Anthurium*, *Schizanthus* ("Poor Man's Orchid") *Cineraria*, *Primula*, *Cymbidium*, *Cattleya*, *Codiaeum* and *Chrysanthemum*.

The glasshouse staff provided exhibits of indoor and hot-house ornamental plants at the Royal Easter Show, the French Exhibition of Art in the National Art Gallery, and Parliament House, and for the Centenary Celebrations of Responsible Government in Australia.

Visitors.—Special groups conducted on tours of the Gardens included H.R.H. Princess Rambhai Baharni, ex-Queen of Thailand and party; a group of visiting American horticulturists; students of the Kindergarten Training College; and various branches of the Country Women's Association.

NATIONAL HERBARIUM.

Routine work and research activities were maintained, and valuable additions were made to the general collection.

Plant Species New to N.S.W.—The following species, with localities of collection as shown, and the country of origin or the previously known distribution indicated in parenthesis, were recorded for the first time in N.S.W.:—

Adriana hookeri, "Water Bush", Griffith-Rankin Springs area; (Victoria to Western Australia).

Corynocarpus sp., Glenugie Peak, Grafton district; (North Queensland and New Zealand). Further material is necessary for specific determination. It may prove to be a new species of this genus. This also is the first record of the family *Corynocarpaceae* in N.S.W.

Grammitis pumila, Thredbo River Gorge, Kosciusko, and source of Murrumbidgee River; (New Zealand). This was a new record for Australia. The species has since been recorded for Victoria and Tasmania.

Grevillea ilicifolia, mallee country in Griffith district; (Victoria and South Australia).

Scirpus montivagus, Kosciusko district; (Victorian Alps).

Stylidium uliginosum, Tweed Heads; (Queensland).

Eriopis brownii, near Launceston, Tasmania; (New Zealand). This species of moss was collected by a staff member in Tasmania and is a new record for Australia.

Naturalised Species.—The following species of exotic plants were recorded as having become naturalised:—

Conyza chilensis, a native of South America, collected at Kyogle; also recorded from Queensland and Tasmania.

Opuntia cylindrica, native to Peru and Ecuador, growing on some acres of land at Cunnigar.

Poa sp., tentatively identified as *P. colensoi*, a native of New Zealand, collected at Lake George.

Sclerachloa dura, native of Southern Europe, naturalised in Victoria and South Australia, and collected in the Goulburn district.

Stipa brachyachaeta, native of South America, collected in the Merriwa district.

Diploaxis myralis, "Wall or Sand Rocket", a native of Europe, naturalised in South Australia and the Broken Hill district, and now naturalised in the Campbelltown area.

Cyperus eragrostis, native of South America, previously known as naturalised plant from Sydney southwards, collected in the Armidale district.

Records of Rare Species.—The following species, very rarely collected, were identified:—

Adenochilus nortonii, at Barrington Tops.

Asperula ambleia, in the Armidale district.

Callitris preissii, in the Widden Valley.

Eucalyptus siderophloia, a form collected only once previously, on each occasion from the Upper Clarence River district.

Homoranthus darwinoides, in the Widden Valley.

Kochi spongiorcarpa, 70 miles north of Broken Hill.

Microtis magnadenia, at Terrey Hills in French's Forest. This species had not been collected since it was described in 1930 from a specimen collected at Lake Wonboyn.

Ptilotus erubescens from Deniliquin district.

Targionia harpophylla, a liverwort at Munghorn Hill on the Mudjee-Wollar Road.

Templetonia sulcata, in the Griffith-Rankin Springs area.

Extensions of Range.—Field observations by the botanical staff and other collectors increased the known range of the following native species as indicated:—

Acetophila mooreana, southwards to Kiama-Minnamurra area from Gloucester.

Alangium villosum, southwards to New Lambton near Newcastle from Upper Allyn River.

Centrolepis fascicularis, northwards to the Doughboy Range in the Glen Innes district from Broken Bay.

Cupaniopsis foveolata, southwards to Hastings River district at Doyle's River State Forest from Dorrigo.

Dodonaea peduncularis, southwards to Griffith-Rankin Springs area from Peak Hill.

Erechtites mixta, northwards to Little Mount Spiribo from Central Tablelands.

Eucalyptus deanei, "Dean's Blue Gum", southwards to the Ebor-Hernani district, west of Dorrigo, from the Queensland border to Glen Innes. The only other population of this species occurs from the Hunter River to Burrigorang Valley.

Eucalyptus sieberiana, "Black Ash" or "Silver-top Ash", northwards to the Olney State Forest, north-west of Wyong, where it apparently coincides with the limits of the Hawkesbury sandstone formation.

Ficus stenocarpa, "Large Sandpaper Fig", southwards to New Lambton near Newcastle from Forster.

Grevillea sphacelata, northwards to the Gibraltar Range, 40 miles east of Glen Innes from Port Jackson.

Juncus capitatus, northwards to Armidale from the Sydney district.

Lepyrodia muelleri, westwards to Inverell, previously known only from the coastal districts.

Pseudomorus brunoniana, "Whalebone Tree", westwards to Mt. Wilson from Coastal areas.

Schizaea rupestris, southwards to Bundanoon from Sydney district and Blue Mountains.

Weed Species.—The following exotic species were recorded as becoming potential weeds in the areas designated:—

Erigeron karvinskianus, a native of Mexico, commonly cultivated as an ornamental, was identified as a weed growing in the Alstonville district. This is the first record of this species escaping from cultivation.

Plagiobothrys canescens, native of California, was received from the Berrigan district, where it was reported as growing strongly in several crops and in pastures. Stock are said to dislike it and refuse hay containing the weed.

Scleranthus annuus, "Annual Knawel", a native of Europe and Asia, was recorded as a weed at Guyra.

Solanum radicans, was reported from Swan Creek on the far north coast. This weed has spread in the Hunter River district in the last few years, and has recently been declared noxious in the Shire of Muswellbrook.

Exchanges with other Institutions.—A total of 2,895 herbarium specimens was received, from sixteen overseas and two Australian institutions; and 2,353 specimens were forwarded to twenty-one overseas and one Australian institutions on an exchange basis.

In addition to these exchanges some hundreds of herbarium specimens were forwarded on loan to overseas and Australian institutions for investigation in particular groups of plants.

Special Additions to Herbarium Collection.—The balance of the private collection of the late Dr. F. A. Rodway, of Nowra, was handed over to the Herbarium. This amounted to some 10,000 specimens belonging to various plant families collected on the east coast of the Australian mainland and Tasmania. Dr. Rodway was a son of L. Rodway, at one time Government Botanist in Tasmania.

Field Collections and Seed Exchange.—The Seed-and-Plant Collector undertook six major collecting trips, ranging from five to eighteen days' duration, to the following areas; Broken Hill-Wentworth-Mildura-Hay; Wombarra-Minamurra Falls-Nowra; Bundanoon-Bungonia Caves; Cowra-Grenfell-Weddin Mts.; Northern Tablelands-Casino-Coff's Harbour; and Cordobaux-Mt. Kembla-Mt. Keira. In addition, one-day trips were made to specific areas within the County of Cumberland, making a total of seventy-four days spent in the field. Bulk quantities of 850 specimens of herbarium material and 150 specimens of seeds were collected.

On request 210 seed samples were forwarded to twenty overseas institutions in Europe, Asia, North and South America and two Australian institutions. In exchange, 272 seed samples of species selected from the seed lists of thirty-seven overseas institutions were received.

Research.—For the projected publication "The Flora of New South Wales", material has been prepared dealing with the genera—

Oxylobium, *Chorizema*, *Mirbelia*, *Isotropis*, *Gompholobium*, *Jacksonia*, *Sphaerolobium*, *Burtonia*, *Viminaria*, *Daviesia* and *Aotus* of the Family Papilionaceae, and with *Nephrolepis*, *Rumohra*, *Polystichopsis*, *Ampelopteris*, *Thelypteris*, *Grammitis pumila*, *Mecodium flabelatum*, *Meringium vivale* and *Hymenophyllum pumilum* of the Pteridophyta.

Photographs of important historical specimens contained in the Herbarium of the Royal Botanic Gardens, Kew, obtained on loan from the C.S.I.R.O., Canberra, proved of considerable assistance in the study of many of the genera of the Papilionaceae.

A study of the small-fruited olive commonly grown as a hedge-plant in New South Wales has led to its recognition as *Olea africana*, a species distinct from but possibly ancestral to the edible olive *O. europaea*. A re-examination of the Australian species of *Notelaea* led to a review of all the genera of the Oleaceae, and a paper will be published in "Contributions from the N.S.W. National Herbarium", vol. 2, No. 6.

The Australian and exotic collections of the family Convolvulaceae, especially *Ipomoea* and related genera, have been reorganised.

Similar attention has been given to the Lorantheae which have now been arranged according to a modification of Danser's system for the family.

The genera *Pithecellobium*, *Oreomyrrhis*, *Alchemilla* and *Aphanes* have been rearranged in the light of recent monographs.

Research has been carried out on the *Dryopteris decomposita* group of ferns and their generic affinities. This involved the study of certain South and Central American species of *Dryopteris*, to determine their relationship to the Australian species.

The genera *Ixiolaena* (Compositae) and *Actinotus* (Umbelliferae) have been sorted and re-arranged.

Research has been initiated on the genus *Poa*. This contains the "tussock grasses", prevalent in many parts of the State.

The genus *Strychnos* (Loganiaceae), certain species of *Acacia* occurring in Central Australia, and the species *Atriplex spongiosa* and *Atriplex holocarpa* have also been investigated.

Field studies have been carried out on *Eucalyptus* spp., especially the ironbarks and certain other hybrids. *Ranunculus* and *Poa* were studied on the Kosciusko Plateau and other centres of high elevation.

Publications.—Three numbers of the "Contributions from the New South Wales National Herbarium" have been printed. These comprise vol. 2, No. 2, containing a paper entitled "An Enumeration of Plants in the Albury, Holbrook, and Tumbarumba Districts of New South Wales" by E. J. McBarron; No. 3, containing "A Revision of the Australian Species of *Danthonia* DC." by Joyce W. Vickery; No. 4, containing "The Cyatheaaceae of Australia" by Mary D. Tindale.

Two numbers of the "Contributions" are in proof, containing respectively a revision of the genus *Callitris* and a review of the Family Oleaceae. The proofs have been checked.

A paper entitled "Additional Species of the Genus *Diuris* (Orchidaceae) in New South Wales" by H. M. R. Rupp (Honorary Custodian) was published in Vic. Nat., LXXXII, Nov. 1955, 110-111. This contains descriptions of three new species.

Further proofs of "The Trees of N.S.W." were received and checked.

Professional Visitors to the Herbarium.—Many scientific workers from other parts of Australia and from overseas visited the Herbarium to study specimens and to discuss relevant subjects with members of the botanical staff. These included Mr. and Mrs. J. Lovis of the University of Leeds; Mr. S. L. Everist, Government Botanist, Queensland; Miss R. Mason, D.S.I.R., Christchurch, New Zealand; Miss L. E. Cheeseman, of the British Museum; Miss N. T. Burbidge, C.S.I.R.O., Canberra; Mr. J. Christodoulou, F.A.O. Fellow, from Cyprus; Miss M. Brooks, Waite Institute, Adelaide; Mr. C. Hyde, D.S.I.R., Wellington, New Zealand; Dr. Marie Phillips, Snowy Mountains Hydro-Electricity Authority, Cooma; Mr. G. Chippendale, Animal Industry Branch, Alice Springs, N.T.; Prof. N. C. W. Beadle, University of New England; Mr. N. Hall, Forestry Bureau, Canberra; Mr. N. H. Forde, C.S.I.R.O., Alice Springs, N.T.; Miss Betsy Paterson, University of New England; Dr. A. S. Foster, University of California; Dr. R. D. Hoogland, C.S.I.R.O., New Guinea; Mr. Raza Khan, Colombo Plan Fellow, of the Gandhi Gardens, Karachi, Pakistan; Mrs. S. Sahertian, UNESCO Student, Bogor Botanic Gardens, Indonesia; Mr. R. Chambers, New Zealand.

General.—Miss Vickery attended the A.N.Z.A.A.S. meeting in Melbourne in August, 1955, as representative of the Herbarium at the Systematic Botany Committee meeting held in conjunction with the Association's meeting.

The Herbarium's collection of colour transparencies has been increased, facilitated by the issue of a 35 m.m. camera to the Branch. A new projector has also been obtained, enabling more frequent lectures and demonstrations than previously. Colour photography has become so popular recently that more and more transparencies are being submitted to the Herbarium staff for identification.

The Herbarium has benefited by the provision of a new low-power binocular microscope of modern design. Also, new power points and several fluorescent light units have been fitted in the Herbarium, providing better facilities for the study of plant specimens.

Chocked downpipes during torrential rains at the beginning of the year caused flooding of sections of the Herbarium, with damage to over 400 boxes of herbarium specimens. Some 200 boxes had to be discarded, but the contents of most were salvaged and have since been re-incorporated into the collection.

Rumen contents of 59 head of stock (sheep, cattle, horses and pigs) were submitted by Glenfield Veterinary Research Station for the determination of the plants present.

Rev. H. M. R. Rupp, Honorary Custodian of the Cryptogams, was presented with the Australian Natural History Medallion for his lifetime studies on the classification of the native orchids of Australia.

The Chief Botanist and members of the Herbarium staff served on various committees, including the Technical College Horticultural Advisory Committee, the Remembrance Driveway Committee, the Muogomarra Trust, the Men of the Land Standing Committee on Trees and Forests.

DOMAIN.

The Domain was maintained in reasonable condition, although the heavy growth of grass during summer, combined with staff and equipment difficulties, lowered the standard. Very useful assistance was obtained on one occasion from the Army; labour and grass-cutting equipment being provided when most needed.

Provision was made for the usual range of sporting activities, and heavy demands were made on the various playing areas. In addition, suitable areas were provided for such functions as the Anzac Day Service, the Presentation of Colours to the Third Battalion, Royal Australian Regiment, and the assembly of service branches and police for the Parliamentary Celebrations March.

Some road and footpath repairs were carried out by the Department of Public Works.

Contract work commenced on the area leased to the City Council for a car-parking station. The preparatory work of excavation of the site has unfortunately resulted in the loss of forty-seven trees; most of which were well-grown and some of which were comparatively rare. The general appearance of that section of the Domain is undergoing a complete and permanent change. Work also commenced in the Inner Domain, on the construction of the Circular Quay Roadway and the Eastern Express Highway.

CENTENNIAL PARK.

A site was made available for a tree-planting ceremony by Rotary International.

Several concerts were given by the A.B.C. Symphony Orchestra on a selected site.

The usual facilities were provided for the Royal Agricultural Society in connection with the Easter Show.

Arrangements were made through the Division of Animal Industry for the supply of Arab horses for the rangers, and these have proved very satisfactory.

An amendment was made to the regulations prohibiting the bringing in and consumption of liquor in the Park.

A fire destroyed portion of the depot buildings and arrangements were made for temporary replacements.

The removal of concrete foundations and other structures from the site of the old housing settlement was commenced.

Repairs were made to roads and bridges; and maintenance of the main areas was satisfactory, considering the abnormal weather conditions.

The construction of three dressing and toilet rooms, adjacent to the main playing areas, provided very necessary additions to the amenities of the Park.

A considerable number of evergreen oaks (*Quercus virginiana*) were killed by root-rot, following the excessively wet summer, the causal organism being *Phytophthora cinnamomi*.

An investigation was made on trees affected by white ants in one portion of the Park.

ADMIRALTY HOUSE.

Discussions were held with His Excellency the Governor-General regarding the maintenance of the grounds, with satisfactory results.

An inspection of the grounds of Kirribilli House was made, and a report was provided on the possibility of incorporating these with the main areas at Admiralty House.

Decorative plants in pots were provided from the Botanic Gardens for particular occasions.

DIVISION OF MARKETING AND AGRICULTURAL ECONOMICS.

State Marketing Bureau.

Marketing Boards.—The producer controlled Egg, Rice, Potato, Navy Beans, Wine Grapes, and French Bean Seed Marketing Boards continued to function under the provisions of the Marketing of Primary Products Act, 1927-40.

The triennial election of producers' representatives was conducted in October, 1955, in respect of the Egg and the Rice Marketing Boards, and in March, 1956, in respect of the Potato Marketing Board.

Following receipt of a petition signed by a representative number of potato producers qualified to vote at elections, a poll was conducted at the close of June, 1956, on the question of whether the Potato Marketing Board should be dissolved. The result was affirmative, 53.4 per cent. being in favour of dissolution, and action to wind up the affairs of this Board in accordance with the provisions of the Marketing of Primary Products Act will proceed.

In respect of the Rice Marketing Board, suitable action was taken in May, 1956, to fill the vacancy caused by the resignation of one of the two Ministerial nominees on the Board.

At the close of the period under report a vacancy existed on the Wine Grapes Marketing Board as the result of the death of the Department's viticultural officer, one of the two Government nominees. Action to fill this vacancy is proceeding.

Amendments to the Marketing of Primary Products Act and Regulations.—Legislation was introduced into Parliament with a view to amending the Act to provide for:—

- Clarification of the powers of Marketing Boards to make regulations in relation to the marketing of any commodity.
- Extension of the powers of Boards to enable them to act as agents in the marketing of products for which they are constituted (this would have enabled the Potato Marketing Board, for instance, to handle interstate consignments).
- To enable the Egg Marketing Board to make certain refunds from moneys obtained by deductions from later pools to cover moneys deducted from previous pools for the purpose of financing certain building operations.

The Amending Bill had reached the second-reading stage at the close of the period. Amendments to Regulations under the Act comprised:—

- General Regulations covering expenses payable to members of the Egg and the Rice Marketing Boards whilst travelling overseas on Board business, and
- French Bean Seed Marketing Board Regulations relating to the constitution of a quorum.

Market Reports and Statistics.—The Division continued to fulfil its statutory obligations in regard to the collection, compilation, publication and broadcasting of market information. Market prices and trends, the availability of supplies, and other relevant information, were covered in respect of the livestock auctions at Homebush (cattle, sheep and pigs), the poultry and fish markets, the Sydney fruit and vegetable and flower markets, Alexandria railway goods yard, Sussex-street, and Homebush Abattoir.

Reports on the grain market, and on cold store stocks of butter, cheese and eggs were published weekly. Cold storage statistics for fruit were published monthly, together with monthly average prices for a wide range of products. The monthly collection of retail stock feed prices was continued. This covered country centres as well as the County of Cumberland. This information supplemented the monthly collection of wholesale stock feed prices. In addition, the daily collection of foodstuff retail prices, including fruit, vegetables, meat and fish, was continued.



French Bean Seed Certification.

Seven hundred and eight acres, by 67 growers, were entered for Certification, compared with 385 acres, by 44 growers, in the previous year, and 445 acres were provisionally Certified. However, continuous wet weather and the autumn floods offset the progress, and the marketed quantity will be less than the previous year's.

(Photo from Bega office.)

The Australian Broadcasting Commission continued the daily, national network broadcast of market information supplied by the Division. Similar information was provided by the Division to daily and weekly newspapers, and journals, through *Daily Market Reports* and *Weekly Marketing Notes*. Each week's trading was summarised in the latter.

The Division dealt with many inquiries on marketing methods, price trends, and suitable markets for placement of produce, and provided information on the optimum period for the marketing of various types of fruit and vegetables. Continued producer interest and confidence in the Division's market information services have been obvious.

The Division continued to record the movements of primary produce by rail and sea, covering intra- and inter-State arrivals on the Sydney markets. Unfortunately, it remained impracticable to obtain satisfactory information on the movement of produce by road.

Crop Reviews and Forecasts.—Surveys were undertaken at selected periods in the development of wheat, oat, maize, broom millet, potato, pome and citrus fruit crops, for review of crop conditions and to forecast production. The basic information for these reviews and forecasts was provided by the Department's district officers, and by a large number of *honorary crop correspondents* in the various producing districts. The crop reviews and forecasts are used for official purposes; they are also clearly of value to the respective industries, and marketing authorities, and to the press and the general public.

The *monthly* broadsheet, *Review of Grass Conditions and Pastoral Outlook in New South Wales*, was continued, as information to the pastoral industry and allied interests. It is based on data from honorary crop correspondents and inspectors of stock. The co-operation of forestry officers in providing information for *The Quarterly Review of Honey Flow Prospects* is acknowledged. This review is issued mainly for the benefit of itinerant, commercial beekeepers.

Meteorological Services.—An officer of the Division acts as departmental representative in the State Climatological Committee of New South Wales and as liaison officer between the Department and the Sydney Weather Bureau. Extensive meteorological records are maintained and meteorological advice and data are provided by him for the use of officers of the Department and members of the public in relation to farming or contemplated farming pursuits and, in particular, in connection with the Division's crop review and forecasting services.

Economic Research.

The Division continued to conduct research into a wide range of problems affecting the rural economy, including the marketing of agricultural produce, the economic structure of various industries, and management problems on individual farms. Much of the work continued to be in the form of detailed field surveys and subsequent analyses. The Division also continued to co-operate in some of its major research projects with the Commonwealth Bureau of Agricultural Economics. Breadth of the Division's research programme is illustrated by the following summaries of the more important projects carried out during 1955-56, or which were in progress by the end of the twelve months concerned.

Survey of Grazing Properties in the Southern Agricultural Region.—The data collected in this survey were subject of further analyses. Four main areas of research were developed, and a report of the findings was presented to the Southern Agricultural Region Advisory Committee.

(i) **Property Improvement and Development.**—Information was collated relating to the degree of improvement and development of the surveyed properties, and conclusions were drawn as to the scope for further improvement and development. Among the more important findings were:

- (a) Approximately 90 per cent. of the land in grazing properties in the area is suitable for pasture improvement;
- (b) the 1954 area of improved pasture could be doubled without further clearing;
- (c) there is considerable scope for further investment in clearing, subdivision, new buildings, new machinery, and conserved fodder.

An article on this subject was published in the *Review of Marketing and Agricultural Economics*.

(ii) **Estimation of Stocking Rates.**—Correlation analysis was employed to obtain estimates of average stocking rates on natural and improved pastures in the survey area. These estimates were used in conjunction with information on the scope for further pasture improvement, to predict the increase in stock numbers likely to result if all suitable land was sown to improved pasture. It was estimated that stock numbers would increase by between 30 and 40 per cent. in this event.

(iii) **Production Function Analysis.**—A statistical study was made on the relationships between the input of land, labour, and capital and the output (gross income) of about one-third

of the surveyed properties. The analysis indicated that the marginal productivity of the labour and operating capital was, on the average, considerably greater than their cost. This suggests that graziers in the area could profitably intensify their operations by employing more labour and operating capital. Pasture improvement accompanied by more subdivision were among the principal means by which such an intensification of operations could be achieved.

For purposes of comparison, a similar input-output analysis of a sample of north coast dairy farms was made. In this area the marginal productivity of labour was found to be considerably less than its cost.

A lengthy review of the literature dealing with production functions was published in the *Review of Marketing and Agricultural Economics*.

(iv) *Graziers' Use of Departmental Extension Services.*—The characteristics of graziers who had had many, few, or no contacts with the Department's extension services were compared. The better-educated graziers, and those who have had some experience in non-rural occupations have made the greatest use of the extension services.

Articles dealing with so far unpublished findings of the survey are in course of preparation.

Survey of the Cost Structure of Dairy Industry.—A detailed report on the cost structure of the dairy industry in butter-fat producing regions of the State was published in the Division's *Review of Marketing and Agricultural Economics*. This report was prepared in collaboration with the Commonwealth Bureau of Agricultural Economics, and was based on a comprehensive field survey of butter producers carried out in 1953.

Two reports supplementary to the foregoing were also prepared and published by this Division. These reports dealt with the incomes of dairy farmers, and factors affecting income levels in the Richmond-Tweed region of the north coast and in the far south coast of New South Wales.

Economic Organisation of the Beef-Cattle Industry.—Research into the organisation of the beef-cattle industry in New South Wales continued; and detailed arrangements have been made for a comprehensive survey of beef-cattle raising on irrigation farms in the M.I.A., early in 1956-57. This survey will provide considerable detail of beef-cattle management practices and the potential for increasing beef-cattle production under irrigation conditions, detail also of the financial position of large area farms in the M.I.A., and of general management practices on those farms.

Such information will prove invaluable in planning for the future use of irrigation waters to become available in the north-west of the State on completion of Keepit Dam and, later, in the south-west as a result of the partial completion of the Snowy River scheme.

Survey of the Vegetable Industry in the M.I.A.—This survey, referred to in the previous annual report, was completed. A detailed report was submitted to the Vegetable Industry Subcommittee of the M.I.A. Irrigation Research and Extension Committee. The report indicated that the vegetable industry in the M.I.A. is likely to remain a permanent feature of the economy in those areas. It also pointed to various aspects of the industry requiring further investigation, and has proved especially valuable to the M.I.A. Irrigation Research and Extension Committee.

Farm Management Studies on Dairy Farms.—The operation of six dairy farms on the south coast have been studied in co-operation with the respective farmer. Each farmer has kept detailed records of all farm activities. These records are basic to the detailed study of management practices on the farm concerned, with a view to assisting the farmer to improve the efficiency of his farm and to lower his production costs.

This study aims also to provide extension material for use by Departmental officers in the areas concerned. Each of the farms has a different combination of enterprises, and thus presents a different system of farming. Accordingly the research results should prove to be very useful extension material. The data obtained from one of the farms have already been used to illustrate the application of the new technique of linear programming.

Linear Programming.—This is a technique which, in the agricultural field, is new to Australia. It is a method of determining the most profitable combination of enterprises on a farm under given circumstances, and in many respects is superior to the budget method. However, no matter how successful it proves in the future, it will not entirely supersede budgeting, since budgeting has special uses which cannot be met by linear programming.

Linear programming has been widely used in farm management work in the United States of America, and is also being used widely in connection with industrial resources allocation problems.

A study of the linear programming technique and its application to agriculture in Australia was made during the year, and a report was published.

Given the necessary input-output data, at present largely unavailable in a satisfactory form in Australia, and sufficient mathematical competency among research workers, the technique would appear to have a great potential. As more data becomes available it should have considerable practical application in Australian agriculture.

Statistical Analysis of Seasonable Price Trends.—A statistical analysis is being made of seasonal price trends for fruit, vegetables, and livestock. The object is to isolate the seasonal elements from other variances, to seek signs of changes in seasonal patterns and the explanation thereof, and to calculate the statistical significance of the price patterns derived.

The results of this analysis will be available in 1956-57, and should provide a very sound basis for advice to producers as to the optimum time for marketing various commodities. Advice of this kind has frequently been requested, but adequate information basic to sound advice has generally not been available.

Competitive Position of Butter and Margarine.—Margarine manufacturing quotas were increased substantially. To assess the possible repercussions on the dairying industry, a detailed investigation of the effects of increased margarine consumption on butter consumption and prices was made, and published in the *Review of Marketing and Agricultural Economics*.

Effects of Lower Wool Prices in Credit Restrictions on Farm Development.—A survey was carried out on seventy-five grazing properties in the southern agricultural region in an attempt to measure the effect of the lower wool prices which have ruled this season, and the effect of credit restrictions on farm development.

The survey disclosed that although credit restrictions had effected some reduction in the rate of farm development, the major cause of a significant fall found to have occurred in the rate of development was the lower level of wool prices.

Consequent on this survey, a suggestion has been made to the Australian Agricultural Council that the effects of existing credit policy on national rural productivity should be comprehensively examined.

Study of the Australian Citrus Industry.—The production potential and market prospects for the Australian citrus industry have been closely studied. The report outlined the various means by which Government and other interested organisations could formulate the appropriate planting policies, forecast production accurately, and adapt marketing methods to help improve the average return to growers.

Anticipated additional work on this project will involve an examination of aerial photographs of the many citrus-growing regions of this State. That will enable the Division to check on recent planting trends, provide a reliable basis for accurate production forecasts, and also a background for a future field survey of the citrus industry.

Analysis of the Demand for Farm Products.—A report was prepared describing the statistical methods by which the demand for various farm products may be analysed, and the practical uses of such analyses, including an improved economic advisory service to farmers.

It is noted that this report, published in the *Review of Marketing and Agricultural Economics*, attracted favourable comment from the Statistical Research Section of the United States Department of Agriculture, a section responsible for the Outlook and Situation Reports which are a regular feature of the U.S.D.A. advisory services to farmers. Research on this project is continuing.

Research into Crop Forecasting Methods.—Research into methods of crop forecasting continued. The main direction of this research has been towards improvements in the graphical regression techniques, a method which has already given good results. It is intended to carry out more research on the method in the forthcoming year.

An analysis of some of the results of this work was published in the past year. The method has already been applied to some of the Division's crop forecasting, and has speeded up the preparation and release of forecasts.

Other Research Projects.—Other research projects were carried out, or were in progress by the end of the year. These included:—

A Survey of the Warrell Creek Improvement Scheme—at the request of the Water Conservation and Irrigation Commission, as a point from which to assess in due course the effect of this particular improvement scheme on production. The scheme is small, but is of some importance insofar as it is the first of its kind in this State. If it proves successful, it is likely to be followed by many other similar small scale river improvement programmes.

Production Potential in the Namoi Valley—a short reconnaissance survey was carried out. It is expected that this will be followed up later, in connection with proposals for the utilisation of Keepit Dam Waters.

Economic Effects of Quick-Freezing—in view of the growing importance of the quick-freezing industry in Australia, an examination of the likely effects on the market for fruit and vegetables has been commenced, in collaboration with major quick-freezing processors. This economic study should prove most useful both to farmers and processors.

Rural Credit Facilities.—In view of the importance of adequate supplies of finance in the rural economy, this study has been continued. It aims to formulate ways and means of improving sources of rural credit.

Farm Management Service.—Discussions have proceeded with a view to the introduction of a comprehensive service by the Division. It is hoped that it may prove possible to implement a Farm Management Service in 1957.

Advisory, Educational and Extension.

General.—Advice on economic policy affecting agriculture remains one of the Division's important functions. The Division is frequently called upon to advise other sections of the Department as well as other State Departments and instrumentalities in respect of various matters of economic policy affecting agriculture. It is also called on to provide such organisations as the foregoing, and also commercial firms, the press, and farmers organisations, with statistical and allied information relating to the rural industries.

The Division has continued to assess the supply-demand position for farm machinery and all basic materials used in the rural industries, including building materials, fertilisers, and high protein feeds. Recent surveys of the supply-demand position have indicated that there has been a marked improvement. At the end of the year there were few serious shortages of machinery or any of the basic farm requisites. Surveys by the Division in connection with farm machinery and high protein feeds have been used as the basis for policy advice in connection with the export of these items from Australia.

Officers of the Division have addressed numerous short-term schools for farmers, meetings organised by the University of New England, by the Agricultural Bureau, by other farmer groups, by professional societies, and various other organisations, on many economic aspects of the rural industries and related matters.

The Division continued to provide a lecturer in agricultural economics at Wagga Agricultural College, and discussions have proceeded with Hawkesbury Agricultural College with a view to increasing the farm management content of that college's course in agricultural economics. The Division is responsible for examining in agricultural economics at both of these colleges.

Colombo Plan and FAO Students.—Courses of study and instruction in agricultural economics and the marketing of farm produce have been provided for Colombo Plan and FAO students from several countries.

Publications.—The Division continued the regular publication of its periodicals, including the quarterly *Review of Marketing and Agricultural Economics*, weekly *Marketing Notes*, monthly *Report on Production Trends*, monthly *Review of Grass Conditions and Pastoral Outlook in New South Wales*, as well as the regular crop reviews and forecasts. Several contributions were made to the Department's monthly *Agricultural Gazette of N.S.W.* under the title of "The Business of Farming". Officers also contributed articles to various journals and newspapers.

Representation at Conferences and in Committees.

The Chief of the Division of Marketing and Agricultural Economics continued as the Departmental representative in the State Nutritional Committee and in the Irrigation Development and Food Production Advisory Committee.

The Principal Economics Research Officer continued as Executive Officer of the State FAO Committee. The Division was also represented in the City Markets Advisory Committee, and the State Climatological Consultative Committee.

DIVISION OF INFORMATION AND EXTENSION SERVICES.

Editing Section.

The section maintained production of the monthly journal *The Agricultural Gazette of N.S.W.*, the monthly reprint therefrom, *Poultry Notes*, the bi-monthly journal *Herd Recorders' Letter* which, as from January-February, 1956, became *Dairy Topics*, the weekly sheet *Press Copy*, the production and/or revision of booklets/pamphlets/leaflets within a range of some 900 titles and of special handbooks as for short-term schools conducted in various places by various units of the Department.

Agricultural Gazette of N.S.W.—Circulation of this monthly periodical (96 p.p., illus., incl. 43 pp. adverts) increased from 30,600 to 31,100. Circulation of *Poultry Notes*, monthly reprint from the *Gazette*, increased from 5,800 to 6,300.

Layout and general presentation of the *Gazette* underwent further improvements but the completely altered format forecast in the previous years' report was not achieved—because the Printer could not secure from the Treasury the necessary advance of funds pending additional revenue from higher advertising rates which would have accompanied the change.

Costs of the *Gazette* colour cover block were reduced by at least 50 per cent., from £85 per issue, by altering the cover layout and the size of the colour block.

Advertising rates for *Gazette* space were varied upwards to a level between the former rates and those which would have applied to the new format. Existing contracts must run their full term. Thus the effect of the increased rates will not be fully apparent until 1956-57.

Dairy Topics (vice Herd Recorders' Letter).—The change of name dated from the January-February, 1956, issue, and the bi-monthly is now posted direct by the Printer to dairy farmers throughout the State. The mailing list is near to 18,000. Formerly the publication was distributed through dairy factories and field officers mainly to herd recording farmers. Distribution in 1954-55 was 2,100 as against 18,000 to-day. Cost of this periodical and its distribution are borne by the Commonwealth Dairy Industry Extension Grant.

Press Copy.—This weekly sheet, to newspapers and radio stations, included 648 articles in fifty-two issues. Circulation is near to 1,000—including field officers and various institutions in addition to the newspapers and radio stations.

Stereo Loans.—Loan of stereos of blocks used in *Press Copy* increased to 620, compared to 394 in 1954-55. The big increase was helped by systematic promotion of the use of stereos illustrating livestock purchased overseas by the N.S.W. Stud Stock Buying Delegation.

Roneoed, Press Releases.—One hundred and sixty-two statements, mainly from the Ministerial office, were stencilled, roneoed and despatched to newspapers and radio stations. Approximately 44,388 copies, from the 162 titles, were despatched. In 1954-55 there were 197 releases. The reduction from 197 to 162 was largely accounted for by the Minister's absence overseas, for several months.

Booklets, Pamphlets, Leaflets.—Some 130 such items were under editorial attention and submitted to the Printer in the year.

A concerted effort has been initiated to amalgamate leaflets on closely "tied" subject matter. A factor to be watched closely however, is that "savings" in printing may be more than offset by distributing consequent larger publications to persons whose needs would be met by only a section of the amalgamated contents.

Farmer Handbooks.—The "Weeds" Volume has been completed for printing and is with the Printer. It is estimated as likely to comprise 400 pp., with illustrations including some £1,200 worth of colour plates financed by the Commonwealth Agric. Extension Grant. The "Pastures" volume is in preparation. To date, five of the projected eleven chapters have been compiled.

Inquiry Counter and Publication Distribution Section.

Inquiries.—Inquiries totalled 84,985, compared with 161,763 in 1954-55. Interest is drawn by the big reduction. It seems probable that the consignment of publications in quantity to

country offices and greater distribution of publications from country offices, have contributed in no small degree to the reduction in inquiries received in Farrer Place.

Inquiries.	1954-55.	1955-56.
Telephone	37,346	23,190
Postal	43,658	22,969
At Counter	80,759	38,826*

*Excluding inquiries at the R.A.S. information counter, for which the statistics were not kept.

Home Gardens Inquiry Officers Contributions.—Additional to the above, the H.G.I.O. attended to 4,000 inquiries:—Telephone, 1,050; postal, 950; at counter, 2,000.

His statistics provide a measure of the volume of service rendered by him in the eleven months since he took up duties in the counter section. It is not implied that the other inquirers, not handled by him, did not include home gardeners or urban dwellers. The inquiries he handled were, however, of such character as in earlier years would have necessitated handling on other floors—by subject matter specialists in the various Divisions and Branches.

Publications Distribution.—Eight hundred thousand two hundred and eighteen free publications (969,407 in 1954-55) and 4,080 sale publications (3,984 in 1954-55) were distributed. The total includes consignments to country offices.

Several of the most-in-demand publications were out of print for at least a substantial part of the year, otherwise the discrepancy between distribution figures of the respective years would have been much less noticeable. These included "Scientific Poultry Feeding", "Spraying Guide", "Household Insect Pests", "Pruning Garden Shrubs", "Feeding Pigs", "Backyard Poultry Keeping".

Suggested Effect of Country Offices on D.I. & E.S. (Farrer Place) Inquiry Totals.—The following tabulation, showing a progressive post-war incline to a peak year in 1952-53 and thereafter a progressive decline in total inquiries received (by letter, by 'phone and in person) in the "Publication, Distribution and Inquiry Counter" section of this Division is interesting

Year.	Inquiries Total.	Publications Distribution.
1950-51	59,721	198,473
1951-52	107,739	798,311
1952-53	215,819	1,516,562
1953-54	188,352	1,500,867
1954-55	161,763	965,407
1955-56	84,985*	800,218

(* Plus 4,000 handled by the Home Gardens Inquiry Officer in this section.)

It is speculated that the trend in "Inquiry Totals", in the recent three years, reflects in part the development of Regional Extension Services (1953), Co-ordinated Extension Services (1952), and the greater number of requests for information and publications now satisfied by country officers of the Department.

In those three years our D.I. and E.S. inquiry total has declined to one-third of the peak reached in 1952-53. In the same period the number of publications despatched or distributed from this office has declined too, but less steeply. The 1955-56 figure 800,218 would have been far closer to the 1954-55 figure of 965,407 if many of the much-called-for publications had not been out of print.

It has not been possible, readily, to dissect that portion of the publications' distribution total which represents despatch in bulk parcels to country officers; but it is known to have been a high proportion. A progressive dissection will be maintained in the ensuing year.

Regional Publicity.

The Wagga Wagga position this year has been occupied for nine months from October, 1955, and the Goulburn position for four and a half months from February, 1956.

(a) PRESS.

The *Western* publicity officer made 124 press releases, and also sustained a weekly column (fifty columns syndicated) and inaugurated a fortnightly column (six columns syndicated to date). He is providing a service to not less than forty newspapers (twenty-five in the Region, ten in towns adjacent to the Region, and five of metropolitan origin). His 124 press releases were additional to 146 made directly by field officers in the Region.

† 67026—G

It is interesting that his releases totalled 179 in the preceding year whilst field officers' releases totalled 55. This year the swings to 124 and 146, respectively, may indicate his affect on field officers' active use of the press as a tool.

The *Far North Coast* publicity officer made 300 press releases, and has also surveyed their usage. His survey indicates that 90 per cent. of the releases were used in papers within the Region and that not less than 30 per cent. gained a place in Sydney and Brisbane rural weeklies.

The *Southern* officer was concerned with 206 press releases in the nine months since taking up duty in October, 1955. In the 206 were 74 from district officers in the Region and 132 from the Regional office. The Southern office is concerned with sixteen newspapers published in the Region and eight published outside. In all, 230 publicity statements were made in the twelve months, as against 83 in the preceding twelve months, whilst the publicity officer position was almost continuously vacant. Of the 230, only 24 were made in the period July to September, 1955, whilst the position was vacant.

The *South Coast and Tablelands* officer, providing a service for twenty-four newspapers, was responsible for 75 releases in the four and a half months since taking up duties. He has also sustained a weekly column since 1st May, 1955. The nine columns, syndicated, included five to six items each, forty-seven items in all.

Each of the Regional publicity officers also fulfilled a liaison role in relation to newspaper offices and visited newspaper offices at every opportunity, to get reactions to and suggestions about the material released.

(b) RADIO.

The *Western* officer has been associated with not less than 549 broadcasts in the twelve months (295 topics and 254 re-broadcasts). In the preceding year his total was 399. Radio stations in his territory total six. Much of the material was tape-recorded and syndicated.

The *Far North Coast* officer was unable to give as much time as he would wish, towards developing officers' interest in radio, but expects in the next twelve months a big improvement in that direction. Even so, his survey showed that of the 300 press releases (also issued to the four radio stations in the Region) not less than 90 per cent. were used by the radio stations.

The *Southern* officer has been associated with ninety-four regular sessions broadcast by 2CO (A.B.C.) and 2WG (Wagga Wagga, "B" class). He has also been responsible for thirty-three special topics used by "A" and "B" class stations. Many of his tape recordings prepared for the Wagga Wagga station were used also by 2LF (Young, "B" class). The total of 127 broadcasts in the twelve months contrasts with sixty-seven by the Region in the preceding year when the publicity officer position was vacant.

South Coast and Tablelands region sustains now a regular weekly session over 2GN (Goulburn, "B" class) and the publicity officer has been responsible for sixteen weekly sessions in his four and a half months in the position. He has also provided tape-recorded interviews for the Canberra and the Bega "B" class stations.

Radio has become so important a component of the extension service in each of the Regions that each Regional publicity officer has pressed justifiably for the issue of tape-recording gear more in keeping with broadcasting standards than is the gear with which they are at present equipped.

(c) RURAL GROUPS.

In keeping with their role as representatives of the Division concerned with the Agricultural Bureau of N.S.W. and kindred rural groups effecting extension service, the Regional publicity officers have in the main taken an active interest in the welfare of such groups.

The *Western* officer has taken extension aids equipment (public address system and recording gear and leaflet dispensers) to thirteen Agricultural Bureau field days. Importantly, he assisted the planning of sixteen Bureau branches' activity programmes. He has help to form new Bureau branches and to re-inaugurate others, especially where their activity would help in the Region's special campaigns, e.g., serrated tussock control, apple black spot eradication, plant nutrition trials, etc.

Liaison with the Junior Farmers' Club, Soil Conservation Service, Weeds Councils, Show Societies, Pastures Protection Boards, Graziers' Association and other rural organisations has also been a feature of his work with groups.

The Far North Coast officer has a comparable record. He attended forty-three meetings of Agricultural Bureau branches, usually with films, or slide collections, and projection gear; and helped the branches to formulate activity programmes for three, six and twelve months ahead. Four new Bureau branches have been formed through his interest.

South Coast and Tablelands office is similarly active in its association with Agricultural Bureau branches. An outstanding achievement in this Region was the four days "Animal Husbandry School" initiated by Murrumbateman branch of the Agricultural Bureau and consolidated, from an organisational viewpoint, by the Regional office.

(d) MISCELLANEOUS.

Each Regional publicity officer was concerned in the organisation of short-term schools ("Leadership", "Animal Husbandry", "Farmer Refresher", etc., courses of a few days' duration); each was concerned in promotion of agricultural show exhibits; each accepted responsibility for good condition and competent use of Regional extension aids equipment—cameras, projectors (cine and still), tape recorders, public address system, microphones, etc.

Library Services.

Effect of Staffing Branch Libraries.—After a period in the Central library for instruction in and experience of the Department's library services in general, one library assistant has now been "decentralised" to the branch libraries in Division of Dairying and the Entomological Branch, and another to the branch libraries in Division of Marketing and Agricultural Economics and the Chemist Branch.

Standard library practices have now been introduced in those branch libraries. Already there has been a substantial saving in other professional and clerical officers' time in those branches, plus the improved service. Arrears of library work are being recognised there and overtaken. Because of the compilation of accurate records of holdings of serial literature, etc., the quality of reference work is improving. This must benefit officers of the Department, and will assist the handling of 'phone and other inquiries of library significance received from external sources.

The effect has been apparent for some time in the Division of Animal Industry and the Glenfield Veterinary Research Station branch libraries, which share a library assistant, and in the branch library respectively at Hawkesbury Agricultural College and the National Herbarium, Botanic Gardens, each of which has a full-time librarian.

Library Accessions.—10,082 items (books, periodicals, bulletins, reports, etc.) were accessioned from world-wide sources, compared with 11,185 in 1954-55. New books totalled 309, compared with 289 in 1954-55.

Those accession figures, in so far as they include purchased items, do not include books acquired from Agricultural Extension Grant funds (Project 213—"Development of Library Facilities for Extension Service"). That Project resulted in another 97 new books for location at country offices of the Department. At 30th June, 1956, there were 984 books, acquired under Project 213, distributed amongst 59 country offices; except for 43 held in the Central library for country circulation.

Central Library Loans.—21,501 items of literature were loaned, compared with 18,352 in 1954-55. The weekly despatch rate to country offices ranged from about 300 to 500 items. The 1954-55 loan total was lower because the library service had to be suspended at times, due to mezzanine floor construction.

Library Photo Copying Service.—This is a development of Agricultural Extension Grant Project 213. The equipment has been used as occasions arose but no concerted effort has been made to promote the service, pending appointment of an officer. Commonwealth approval of salary for an officer was secured in December, 1955. Public Service Board approval to appoint an office-assistant to the position has been secured. The position was unoccupied at 30th June, 1956.

"Union Catalogue of Scientific Periodicals in Australian Libraries."—One of the major achievements of library staff this year was the preparation and listing of 1,651 new and revised entries in the serial literature holdings of this Department. This was undertaken for C.S.I.R.O. publication of a Supplement of the Union Catalogue. The typing, checking, filing and editing of the entries was completed in three days' and nights' sacrificial effort by the library staff.

Library Accommodation—Mezzanine Floor.—Completion of the mezzanine floor in September, 1955, after some eleven months work by Public Works Department effected a major

improvement. When shelving has been installed, the expansion will permit the accommodation of portions of sets now occupying space in various Divisions/Branches. It may also help to relieve the congestion caused by publications' storage in the "Publications Distribution and Inquiry Counter Section" of the Division.

Other Institutions' Use of Library.—Loans of reference material to Universities, C.S.I.R.O. research stations, and personnel of other institutions engaged in agricultural activities, continued, at an increased rate. Reciprocal borrowings on behalf of Divisions/Branches of this Department also increased.

Overall, the past year was marked by considerable progress in the Department's library services.

Display Artist/Designing Services.

Special and Show Displays.—The major effort was the Department's 1956 display at the Sydney Royal Show, comprising a serrated tussock bay, an argentine ant bay, an information bureau, and a theatre. Again at the R.A.S. Showground, an information bureau was constructed in the Hordern Pavilion for the Department's association with a Dairy Machinery Show promoted by the Australian Institute of Dairy Factory Managers and Secretaries (May, 1956).

The section also contributed to:—"The Milky Way" exhibition promoted in Sydney Town Hall by the New South Wales Milk Board; a "Professional Careers Exhibit" at Cootamundra promoted by Public Departments, and another promoted in Sydney by the Australian Institute of Agricultural Science; a "Fruit Fly Prevention" display promoted by the Western Regional office in western towns; a Tamworth Health Week display, promoted by district officers; the Wagga, Byron Bay, Mullumbimby, Grafton, Pambula, Orange, and Bathurst show exhibits promoted by country officers; and others.

Publications' Art Work.—The art-works were produced for the covers of ten booklets, principally in the District Pasture and District Fodder booklet series, and also for 132 illustrations included in booklets and brochures, and in articles in the Agricultural Gazette, Herd Recorders' Letter, and Dairy Topics, etc. Some 138 photographs were retouched for block making occasioned by Gazette articles, and booklets.

Lecture Aids, Charts, Slides, Maps, etc.—The art-work and total "aid" were produced in respect of nine charts conceived by officers of various Divisions. One allied item produced was a portable, roll-up blackboard; and another was a comprehensive flannelgraph for use at extension method schools.

The design and finished art-work were produced for 53 x 35 mm. slides used in extension service, and for four title frames in the 16 mm. film "Establishing Irrigated Pastures" produced by this Division. A heavy volume of sign and ticket writing was also accomplished—field day directional signs, road signs for Hawkesbury College, thirty-five signs required for the Opening Ceremony at the Dairy Technology School, and so on.

Display Equipment Servicing.—Automatic 35 mm. projectors, propomats, and transparency brackets with electrical fittings were kept in service, and were crated for despatch as needed by country officers for local shows and window displays.

Photographic Aids Services—Cine and Still.

Field Officers' 35 mm. Photography.—5,250 colour and 6,060 black and white diapositives (35 mm. slides) were returned to country offices, with tutorial comment on photographic technique where such comment was appropriate. The 1954-55 figures were respectively 4,720 and 8,130.

Each cassette of exposed 35 mm. black and white film received from a country office requires an identification lettering of the film by the photographic aids section, then the requisitioning for processing by the sub-contractor (through the Government Printer's office). The processed negatives and prints (35 mm. diapositives ready for projection) are channelled back from the sub-contractor through the Government Printer's office to this Division. Thence the diapositives are sent to the field office concerned—with such tutorial comments as seem desirable. The negatives and a duplicate log-sheet for each cassette of film are retained in the photographic aids section. Any frame which would provide a worthy print addition (6 in. x 4 in.) to the central library is catalogued, and a print is arranged.

Each 35 mm. kodachrome cassette also comes to this Division and is similarly handled, except that Kodak Ltd. is substituted for the Government Printer and sub-contractor at the processing end.

There being near to 80 x 35 mm. cameras distributed amongst country offices and, in many instances, several officers using each camera, the above procedures have obviously accounted for a great volume of the photographic aids section's work in this as in the preceding years.

Tutorial Letters.—630 letters conveying advice on photographic technique were forwarded to field officers.

Central Photographic Library.—504 additions were made to the catalogued photographic library, and represented an approximate 8 per cent. selection of the field officers' black and white photography.

Print Service.—A severe check was maintained on officers' requests for black and white prints (as distinct from 35 mm. black and white diapositives). Even so, 2,897 prints were arranged. Most were for editorial staff's use in publications or for use in reports to be submitted to their principals by officers of field institutions. Not less than 1,100 of the total were required by the Dairy Division, Herd Recording section, for livestock records and identification purposes. The total also included 129 enlargement prints (12 inches x 10 inches or greater) required for use in displays. Some of these were transparency prints.

Charge Printing.—Thirty prints at 5s. each were supplied to external organisations for use in publications. This new, charge practice has halted the tendency of organisations to request, indiscriminately, large numbers of prints. However, in time the charge service may develop more notable proportions.

Display Series of Slides.—Many special groupings of slides, in colour and in black and white, were selected for specific displays where propomats/automatic projectors were featured. Their captioning and mounting occupied considerable well spent time.

Miscellaneous, Photographic Assignments.—The photographic aids officer and technical assistant undertook photographic assignments when special skills were required. These included such occasions as the photography of "contraband salami" as evidence for the Animal Quarantine Service; "fruit case topping", for the legal section; poor grading of packed fruit, for extension slides; new varieties of pome fruit bred or selected by fruit research officers; prime beef carcasses, for livestock extension service; etc.

Sixteen mm. Cine Film Production.—The Division completed the production of the film "Establishing Irrigated Pastures" (800 feet, sound, colour) for extension work by M.I.A. and Murray River district officers. The film has been in use since April, 1956.

Contract production of the film "Meat to Market" (900 feet, sound, colour) organised by this Division, was completed in February, 1956, as an Agricultural Extension Grant expenditure. The film has been in use since March, 1956.

C.S.I.R.O. production of the film "Two Blades of Grass" (referred to as "Pastures in Southern Australia" in the 1954-55 Report) was completed. The Division assisted the C.S.I.R.O. to produce this film. It has been in use for the greater part of this fiscal year.

"Skeleton Weed" and "Serrated Tussock", two films in contract production, under Agricultural Extension Grant expenditure, are well advanced. At 30th June, 1956, it was apparent that they should be ready for extension use before the spring of 1956.

Sixteen mm. Cine Film Library Service.—There are 198 titles in the Division's film library, compared with 174 at 30th June, 1955. Some 806 individual film loans were made in 300 colated programmes, compared with 138 programmes in 1954-5 when the service was suspended for six months. Film checking and reconditioning make heavy demands on the Division's time. Each film is checked out, and checked in for evidence of reconditioning needs. On the basis of 806 films loaned and double checked, not less than 1,500,000 feet of film were closely examined during the year.

Film Appraisal Screenings.—The Division organised nineteen appraisal groups, intra-Departmental, to view new films and determine their place in extension programmes.

Visual Education Aids in the Field.—The number of 16 mm. cine film projectors at field offices has increased from thirty-eight to forty-one. Film strip/slide projectors (35 mm.) increased by four to eighty-five, but there are still several obsolete units which will be withdrawn as opportunity permits. Office-desk slide viewers, for use in individual contacts in extension service, increased by three, to sixty-six.

Radio in Extension Service.

The extension officer (Radio) used twenty-eight week days in country districts, in contact with field officers and radio stations.

The twenty-eight days in country districts, permitted tutorial contacts with not less than fifty-six field officers who contribute regularly or intermittently to farm radio sessions. The "tape-recorder towns" visited were:—Murwillumbah, Lismore, Grafton, Kempsey, Taree, Kiama, Goulburn, Wagga, Young, Orange, Dubbo, Gunnedah, Tamworth, Armidale, Glen Innes and Inverell. There he gave advice to field officers in respect of tape-recorder management and maintenance and radio presentation methods. In most instances tutorial field recordings were made with the officers.

The extension officer (radio) reports that the following Radio Stations at present have regular farm sessions to which field officers contribute in person and/or by tape-recordings:—2CR and 2GZ (Orange), 2CO (Corowa), 2WG (Wagga), 2GN (Goulburn), 2NU (Tamworth), 2NA (Newcastle), 2NR (Grafton), 2PK (Parkes), 2NZ (Inverell), 2DU (Dubbo), 2MU (Mudgee), 2BS (Bathurst), 2CY (Canberra), 2WL (Wollongong), 2BA (Bega), 2LM (Lismore), 2LT (Lithgow), 2KA (Katoomba).

The officer reports also that the following Radio Stations have sessions in which farm subject matter is broadcast and to which field officers make intermittent contributions:—2MW (Murwillumbah), 2AD (Armidale), 2MO (Gunnedah), 2QN (Deniliquin), 2BE (Bega), 2LF (Young), 2AY (Albury), and 2KM (Kempsey).

The Agricultural Bureau of New South Wales.

Active branches, district councils and Divisional councils of the Agricultural Bureau now total 209. More of the branches are financially affiliated with the State Advisory Council than at any time since the second world war.

Most of the branches meet monthly for programmed activities:—Lectures, discussion, films, debates, competitions, demonstrations, tours, and field days. The rate of locality field day organisation by Bureau branches was maintained at near to 300 for the year, a major contribution to extension service, voluntarily organised at no direct cost to the Department.

One of the branches, Murrumbateman, organised in collaboration with the South Coast and Tablelands Regional office of the Department, an Animal Husbandry and Pastures School of four days' duration. The average daily attendance was thirty-eight.

Some branches sponsored demonstrations financed by the Commonwealth Agricultural Extension Grant or Dairy Industry Extension Grant. Others recorded, with appropriate field officers, their desire to have a demonstration in their locality.

Special notice has been drawn to Yetholme Branch which is sponsoring in association with the Biological Branch and Horticultural Division of the Department the *Apple Black Spot Eradication Project*. The outcome of this project is awaited with interest here and overseas. Again, a Bureau branch has come into existence at Burruga under encouragement from the Western Regional Office of the Department, with the immediate specific purpose of securing control of serrated tussock in the area.

Fourteen of the nineteen Divisions of the Bureau were represented in the State Advisory Council. Those representatives, with two women councillors, and the State President and Past President, comprised a Council of eighteen members.

Seven of the Divisions promoted an educational Convention, and two conducted a major field day. Convention attendances ranged up to 300 persons. Only one Convention drew less than 100 persons. The Namoi Machinery Field Day, at Tamworth, attracted at least 2,500.

The State Advisory Council met four times. It dealt with many branch representations, passing appropriate industry matters to the New South Wales Council of Primary Producers' Associations, and others of advisory or inquiry interest to the Department of Agriculture.

The 31st State Congress, at Hawkesbury Agricultural College in July, 1955, three days' duration, was organised to the theme "Broad Horizons Enrich the Way We Live". Some 300 delegates and visitors attended the sessions. More than 200 were in residence at the College.

The 3rd Annual Beef Breeder Competition was conducted, by the Bureau Advisory Council in collaboration with the Department's Animal Industry Division and the Rural Bank of N.S.W. It attracted 151 entries, twenty-three more than

in 1954-55. Nine field days were held in association with the judging of district winners for the State award. Many more field days were held at locality level in the course of the competition.

Two Leadership Schools were promoted by the Bureau in collaboration with the Division of Information and Extension Services. These receive reference later.

Awards and donations by the State Advisory Council included £110 for continuation of the Agricultural Bureau Scholarship tenable at Hawkesbury Agricultural College, £5 5s. for a trophy to the Junior Farmers Clubs' Maize Growing Championship, and £21 to trophies for the Junior Farmers Clubs' judging competition associated with the Beef Cattle Breeder Competition.

Women's Extension Service.

The sectional staff of one officer personally contributed a talk or demonstration within the farm home interests field on twenty-two occasions; made five radio broadcasts; prepared women's interest material for articles in fifty-two weekly *Press Copy* sheets and eight articles in the newly instituted Farm Home section of *The Agricultural Gazette*; contributed articles to the *Journal of the N.S.W. Country Women's Association*; appraised fifty cine films for their potential usefulness in rural programmes; prepared questions on home science for competitors in the A.B.C. Competition for State Champion J.F.C. Girl, and served in the judging panel; conducted the Division's play reading library as an aid to extension group activity; dealt, by correspondence, with a wide range of individual inquiries by rural women; and participated as a tutor in the Leadership and Extension Methods Schools staffed by this Division.

Apart from her personal contributions the extension officer (women's service) organised assistance from many institutions, government and private, which could make more comprehensive the Department's services to rural women. Women's sessions at Agricultural Bureau conventions, meetings, field days, and at Departmental field days were enriched accordingly.

The extension officer has been granted approval, and funds under the Agricultural Extension Grant, to attend the 8th Triennial Conference of the Associated Country Women of the World in Ceylon during December, 1956.

Leadership and Extension Methods of Training.

The Division conducted two *Leadership Schools* in collaboration with the Agricultural Bureau:—

- (i) At Hawkesbury College—five days, July, 1955 (thirty-eight rural men and women attended, in the College vacation).
- (ii) At Wolaroi College, Orange—five days, January, 1956 (twenty-six rural men and women attended, in the College vacation).

Chairmanship, secretaryship, meeting procedure, public speaking, organisation of field days and other rural group activities, debating, play reading, projection of cine and still films, press writing for local publicity, and, in general, material that would assist people to be active members of any rural group, were the subject matter of these schools.

Two *Extension Service Methods* courses were conducted.

- (i) At Newport—seven days, May, 1956, for University of Sydney 2nd year Agricultural students (fifty students).
- (ii) At Wagga Wagga Agricultural College—five days, September, 1955, for Wagga Wagga College 1st year students (twenty-four students).

In addition, the Divisional Chief provided ten one-hour lectures—discussions on Extension Service and Methods, at the N.S.W. University of Technology, for 3rd year students in the Faculty of Science (Wool Technology).

Miscellaneous.

The Divisional Chief attended the meetings of the N.S.W. Film Council and the N.S.W. Advisory Board of Adult Education.

The Agricultural Bureau organiser represented the Bureau in the Advisory Council of N.S.W. Junior Farmer Clubs, the Rural Education Committee of N.S.W. Primary Producers' Union, and the Milk Zone Dairy Farm Advisory Committee.

The senior extension officer (women's service) represented the Agricultural Bureau at meetings of the N.S.W. Bush Nursing Association and in conferences with representatives of the Country Women's Association.

The Editor of Publications continued to conduct the Australian Broadcasting Commission's fortnightly Sunday morning "Roadside Mailbox".

Mr. J. N. Potter, Agricultural Bureau assistant organiser, resumed duties in April, 1956, after seventeen months overseas. In that period he worked for a year as an advisory aids officer at a Provincial office of the National Agricultural Advisory Service of England and Wales.

M.I.A. AGRICULTURAL SERVICE.

This Service and the Irrigation Research and Extension Committee (I.R.E.C.) were in the nature of an experiment in decentralised organisation and administration of services for the farmer. The original proposal was for a seven-year period which ended in September, 1954, when the Minister for Agriculture directed that the project should continue for a further period of two years.

In the past year discussions have ensued, culminating in arrangements now well advanced for the establishment of a South-western Region with headquarters at Leeton, in the M.I.A., as from 1st November, 1956.

Position of Agricultural Organiser.—For the greater part of the year the Service was led by an acting organiser, also fulfilling the duties of Manager, Leeton Experiment Farm. As from 26th April, 1956, the officer, Mr. G. A. Crawford, was able to devote his full time to the M.I.A. Agricultural Service as Agricultural Organiser.

Irrigation Research and Extension Committee (I.R.E.C.).—The I.R.E.C. continued as a strong instrument in the advance of M.I.A. agriculture. One of the Committee's achievements this year was the convening of a meeting of interested parties to consider ways and means of carrying out more detailed research into the problem of sun-cracking of rice. Within three weeks of that meeting approximately £3,000 had been contributed by the Rice Marketing Board, Ricegrowers' Co-operative Mills Ltd., and various private milling organisations.

Rice Sun-cracking Investigations, Industry Aids Research.—Investigations designed to demonstrate to industry and growers that many commonly accepted opinions as to the causes of sun-cracking are incorrect have been financed by the rice industry. It is the first occasion in the M.I.A. in which industry has financed a particular investigation into a problem vitally affecting the industry. Three thousand pounds, contributed by the Rice Marketing Board, Ricegrowers' Co-operative Mills and other private milling organisations, will meet the cost of employing and providing transport for two field assistants for three lines of investigation programmed by a special sub-committee of I.R.E.C. The sub-committee of six includes four Department of Agriculture officers.

The results may lead to greatly improved practices especially in regard to high moisture harvesting, bulk handling and drying.

Losses by the Co-operative Mills in the preceding season by sun-cracking have been estimated at £500,000.

Committees.—Every field officer in the Service took part in committee work. Some indication of the extent of committee work as affecting staff is apparent in the following list:—

- I.R.E.C. (Irrigation Research Extension Committee).
- I.R.E.C. Executive Sub-committee.
- I.R.E.C. Land Use Planning Sub-committee.
- I.R.E.C. Rice Industry Sub-committee.
- I.R.E.C. Vegetable Industry Sub-committee.
- I.R.E.C. Reclamation and Drainage Sub-committee.
- I.R.E.C. Rice Sun-cracking Sub-committee.
- I.R.E.C. Peach and Apricot Investigations Sub-committee.
- Winter Watering Advisory Committee.
- M.I.A. Fruit Fly Committee.
- Canning Fruits Convention.
- Regional Conference of Division of Horticulture.
- Extension Groups' Committees.
- District Council of Extension Groups.
- Junior Farmer Advisory Committees and District Councils.
- Staff Conferences on concentrate spray demonstrations.
- Staff Conferences on canning peach varieties.
- Staff Conferences on orchard spray calendar.
- Staff Conferences on vegetable growing guide.

Visitors.—Some 250 visitors, made up of 36 Colombo Plan and United Nation Fellows, 21 Technical College students, 43 overseas and Australian visitors, 90 Wagga Wagga and Hawkesbury Agricultural College students, and 25 "Irrigation School" farmers, were assisted by the Service.

Indian Farmers' Visit.—A commendable "experiment" in human relationships was made possible by the two months' visit to the M.I.A. by fifteen leading farmers from India, visitors under the Colombo Plan. Ten of the visitors stayed individually for approximate two-week periods with various M.I.A. farmers. They were treated as "one of the family" and gained insight which they highly valued, into the social and working life of the Australian farm people concerned. An extract from one of the visitor's remarks at a Leeton "Social" was indicative of the results of the arrangement:—"We are private farmers and are least qualified to speak on high politics, but we can claim that we have closely moved with the common Australian men and women and appreciated their strength. We have understood their aspirations in life and their love of peace and orderly development of the entire world..."

Colombo Plan Social Study Group.—To make a study of Rural Community Organisation, a party of eight Colombo Plan students from four Asian countries—North Borneo, Burma, Indonesia, and the Philippines—spent ten days in the M.I.A. at Griffith. These visitors were following a special course in the Department of Social Studies at the University of Sydney.

The M.I.A. Service contributed to the organisation of a comprehensive programme involving forty-five organisations and seventy individuals, concerned with marketing, processing, building and consumer requirements, and the linkage between government departments, the extension service, and farmers' organisations. The special problem of integration of Italian and Australian communities in the M.I.A. and the work of the New Settlers' League were also closely studied.

The Agricultural Engineer.—This appointment, made possible almost three years ago by a grant from the Commonwealth Bank Rural Credits Development Fund, was the first of its kind in Australia. The engineer completed a survey of tractors, machinery, workshops, etc., on horticultural and large area farms, but this year his work was curtailed by call-up for National Service Training which occupied his time for five months.

The engineer at the close of the twelve months under report was engaged in a series of field tests of various types of header used in the M.I.A., to determine their efficiency relative to the accepted header. Some twenty large American-type headers have been imported into the district. Hence the field comparison tests.

Arrangements have been made for a survey of grading machinery in the Wakool and adjacent districts, at the request of the Wakool Land-use Committee.

Extension Groups in the M.I.A.

Extension Groups continued to function, but with a perceptible decline in "drive" in some localities. Fluctuations in leadership are thought to have contributed to that.

Spraying programmes were well to the fore as discussion material at meetings because of the introduction of new materials. Fertiliser applications were also under discussion. At the Griffith end of the M.I.A. the Groups discussed vegetable production problems on several occasions. Their big problem, land tenure, has been subject of representations to the Water Conservation and Irrigation Commission to open up new land for vegetable production.

Officers of the M.I.A. Service attended Group meetings whenever practicable. W.C. and I.C. officers maintained active interest in underground water problems by talks at groups' meetings.

Participation of Italian-origin farmers in Extension Group meetings at the Griffith end was a notable feature. They are attending in greater numbers and accepting office or other responsibilities. Another section of this report refers in more detail to the work and effects of the Italian Liaison Officer.

The District Council of Extension Groups, co-ordinating body for the eight Extension Groups, remained active and amongst other things convened in conjunction with the Griffith Producers' Co-operative and the M.I.A. Service a meeting of 200 growers to consider pests, diseases, and mineral deficiencies.

Italian Liaison Officer.

The Italian Liaison officer is employed under the Agricultural Extension Grant, as a field officer of the Division of Plant Industry, to help close a gap in the M.I.A. Agricultural Service

which existed by virtue of the fact that some 50 per cent. of the horticultural farms at Griffith end of the M.I.A. are owned by Italian-origin farmers and a further 10 per cent. are share-farmed or lease by Italian or Italian-origin farmers.

This officer has brought the Italian and Italian-origin population into closer contact with the Service in particular and the community in general. His work has been not only to assure that vital information reaches the growers concerned but also to assure that they are brought into and feel themselves to be part of the pattern of M.I.A. life. A measure of success of the liaison officer position has been expressed by Mr. V. C. Williams, pioneer M.I.A. grower and Chairman of I.R.E.C., who has stated "No section of the community is showing more awareness of our common community problems than our Italian-origin farmers; no section is showing more responsibility in its approach to them or more active in working together to tackle those problems."

Publications, Press and Radio in M.I.A. Extension.

Farmer's Newsletter.—A full series of *Farmer's Newsletter* was issued, amounting to 100 pages of horticultural material in the four issues; 6,000 copies were distributed. In response to growers' demand the number of pages per issue was increased from twenty to twenty-four. In the large-area series, distinct from the horticulture series, approximately ninety pages of material were in the four issues.

Press.—One hundred and sixty-four separate items were syndicated as a "Weekly Column" to ten newspapers and radio stations directly serving the M.I.A. A separate weekly release, "Extension Notes", was also made to some twenty newspapers and radio stations. Special, individual releases totalled fifty. In all, about 2,320 copies of "weekly columns", "extension notes" and "special releases" were dispersed.

Bulletins.—Publications consisted of "Fertilisers for Fruit Trees" (1,800), "M.I.A. Vegetable Growing Guide" (1,000), "Report on Housing for the Climate" (2,000), and "My Handy Kitchen" was reprinted (2,000).

The "M.I.A. Vegetable Growing Guide" was published bilingually in English and Italian.

Radio.—The M.I.A. Services' main broadcast continued to be the fifteen-minute semi-dramatised "Farmers' Newsletter of the Air" weekly. A "home service section" was featured in that session each week.

"Farm Front Review" was a weekly evening session on 2RG, Griffith. It included 180 items in the fifty-two weeks.

The Australian Broadcasting Commission's regional news service and "Farm Breakfast Session" also used a number of M.I.A. recordings.

The Screen.—Each cinema in the M.I.A. and surrounding districts as far as Hay received special fruit fly campaign slides prepared by Division of Information and Extension Services. All but one cinema freely used the slides.

Special Italian Language Services.—The following provisions were made:

Newsletter.—Each horticultural Newsletter included an Italian summary of the more important content, 2 pp.

Press.—The two Italian language newspapers, "La Fiamma" and "Il Corriere d'Australie", circulating in the M.I.A., used extension material; in one, a regular weekly column based on the Italian liaison officer's conversion of the M.I.A. Services' "Weekly Column", and, in the other, special releases.

Bulletins.—The "Fertilisers for Fruit Trees" bulletin included a brief message in Italian, directing queries and inquiries to the Service; the "M.I.A. Vegetable Growing Guide" was a completely bi-lingual publication.

Radio.—Extension Group meetings were announced in Italian, over 2RG, Griffith, in time made available in "Continental Music Club" sessions.

Extension Projects.

Large-area Programme.—The pasture projects for large-area farms included pasture management with particular reference to paspalum management; early grazing management of pastures; use of excess growth of pasture in an abnormal season; improvement in irrigation facilities; control of red-legged earth mite. Publicity was the major tool used in those projects and an assessment has revealed encouraging results.

Rice Farm Programme.—Quarantine importance was a major project. Publicity was the medium. The assessment of results revealed a general community awareness of the risk of disease introduction from the north.

Winter Cereals Programme.—Varieties for irrigation were subject of publicity campaigning and a field day.

Vegetable Industry Programme.—Molybdenum deficiency; grading and topping offences; and vegetable seed production advice, were subject of publicity and circular letters with favourable progress results.

Fodder Conservation Programme.—Quality hay was the aim of publicity measures. Farmers are becoming aware of quality needs but the wet spring nullified their good intentions.

Sheep Programme.—Publicity, with a consequent general increase in practice of the recommendations, was given to supplementary feeding; worms, foot rot, and blow fly control; and management of ewes and lambing.

Horticulture Programme.—Publicity, demonstration plots and experiment plots were devoted to control measures for stone fruit rust; red spider; red scale; and light brown apple moth. More spraying was done for light brown apple moth control than ever before. Red scale recommendations could not be carried out, because of the wet conditions.

Orchard hygiene, in relation to various pests and diseases, was subject of publicity campaigns. Similarly, quarantine and fruit fly menace were intensely publicised—through the press, leaflets, window displays, road blocks, and clean-up campaigns. There was no doubt of greater public awareness of the problem and the required measures.

Weed Control.—The use of boom sprays, a novelty a few years ago, has become accepted practice; largely the result of demonstrations by the Weed Control Unit provided under the Agricultural Extension Grant. For two years past the demonstrations have been attracting good attendances at field days. The economical rates of spraying for excellent control of thistles in pastures have convinced farmers of the advantages of low-volume boom spraying.

Horticultural Census.—The Service continued to be responsible for the collection of data in the Census of Fruit Trees and Grape Vines in the M.I.A. Valuable assistance this year was given by a Rural Bank officer. It is anticipated that the completed report will be ready for distribution in July, 1956.

I.R.E.C. now has available figures on the horticultural plantings extending over the past sixteen years; invaluable data for the M.I.A. horticultural industries. A new aerial survey was to have been flown for I.R.E.C. in the autumn of 1956 but abnormal weather forced a postponement to the spring.

Miscellaneous.

Quarantine.—Quarantine and fruit fly control measures have occupied a great portion of the M.I.A. officers' time. The 1956 outbreak of fruit fly occurred after a period of six and a half months without evidence of fly in the M.I.A. For the first time infested fruit was found within town areas. A feature of the season was the interest shown by people, including townspeople, reflected by the many specimens of suspected fruit fly submitted for identification. The credit for this interest is given to the M.I.A. Fruit Fly Committee, a sub-committee of I.R.E.C.

New Trends in the Rice Industry.—An important development has been the trend towards bulk handling, and the associated introduction of American and Canadian auto-headers of various makes equipped for bulk handling.

Farm Woodlots.—The M.I.A. Service continued an active promotion of farmers' interest in woodlots. Some forty farmers have planted woodlots or planned to do so, and soldier settlers in particular have shown interest. Industrial organisations and local government bodies have also sought advice and assistance regarding tree plantings.

A new trial has been commenced, located at Leeton Experiment Farm, partly in respect of species suitabilities but more importantly in search of data as to the effects of various widths of windbreaks on crops, pastures, and livestock husbandry.

On demonstration Farm 238 a further 1,000 trees of *Eucalyptus camaldulensis* (river red gum) have been planted, and an area has been prepared for planting a wide selection of flowering eucalypts. A small pruning trial has also been commenced, in respect of pruning eucalypts such as to obtain reasonably straight growth habit.

1956-57 Programme of Projects.—Programmes have been formulated in respect to horticultural and large-area extension projects for the twelve months 1956-57.

REGIONAL EXTENSION SERVICES.

The policy of decentralised administration of extension and closely allied services continued to function satisfactorily in the four Regions so far established.

GEOGRAPHICAL EXTENT.

There are 133 Shires in the State, and sixty-eight are within the four Regions; 34,391 (49 per cent.) of the holdings are within the sixty-eight Shires, so approximately half the primary producers in New South Wales are in the areas affected by the Regional Extension Services as so far developed.

No additional Region was established in 1955-56 but arrangements are well advanced for establishment of another Region by 1st November, 1956. This has been named South-western and headquarters will be at Leeton in the M.I.A. The South-western Region will contain fourteen Shires, in which there are 5,187 holdings. It will be bounded on the south by the Murray River, on the west by the Western Division, on the north by the Bland Shire, and on the east by the established Southern Region.

In pursuance of the objective of some ten Regions, action has also been taken towards establishment of another in northern New South Wales; sufficient to indicate that it may be inaugurated early in 1957.

PERSONNEL IN REGIONS.

There are 262 Department of Agriculture officers stationed in country districts for extension and closely allied services; excluding veterinary, agricultural college, experiment station, and office assistance personnel.

Of that total 150 (60 per cent.) are within the four Regions. Some thirty-six shorthandwriter-typists and office assistants are located in twenty-eight offices within the Regions.

DECENTRALISATION WITHIN EACH REGION.

District Offices, Far North Coast Region.—Officers in this Region are stationed at Lismore (Regional headquarters), Mullumbah, Tweed Heads, Mullumbimby, Byron Bay, Ballina, Kyogle, Casino, Grafton, Coffs Harbour, and Macksville. Accommodation is now satisfactory, because of developments at Lismore and at Grafton during the year.

District Offices, South Coast and Tablelands Region.—Officers in this Region are stationed at Goulburn (Regional headquarters), Queanbeyan, Bega, Kiama, Crookwell, and Moss Vale. Accommodation is satisfactory except at Kiama, where attempts to find an alternative to the Court House room have been unsuccessful.

District Offices, Southern Region.—Officers in this Region are stationed at Wagga (Regional headquarters), Albury, Cootamundra, Young, Tumut, Junee, and Batlow. Clearing of the site for new accommodation at Wagga has commenced. At Young the accommodation in the Court House is unsatisfactory.

District Offices, Western Region.—Officers in this Region are stationed at Orange (Regional headquarters), Mudgee, Dubbo, and Bathurst. The accommodation position at Orange, where thirteen officers and five office assistants occupy four rooms, is under attention.

REGIONAL ADVISORY COMMITTEES.

An Advisory Committee, comprised of the chairman (the Regional Supervisor), six primary producers, and a citizen from the Regional headquarters city, is now firmly established in each Region. The Committee for the South Coast and Tablelands Regions held their first meeting in December, 1955.

The Committees met at approximate quarterly intervals, and have been closely concerned in effective developments within the respective Region as well as a number of interesting recommendations forwarded on to Central Administration of the Department.

"PUBLICITY" IN THE REGIONS.

A publicity officer employed under the Agricultural Extension Grants a decentralised officer of the Division of Information and Extension Service is stationed at the headquarters of each Region. The publicity officers' contributions to the effectiveness of Regional Extension Services, through use of mass and group media, have been considerable. They are reported comprehensively under "Division of Information and Extension Services".

IN-SERVICE TRAINING ADVANTAGES.

Discussions have occurred with a view to making best use of the Regional Supervision of extension services as means of giving essential experience and guidance to young officers near due to take up district duties.

FIELD ASSISTANCE.

Field officers of all Divisions, and particularly the district agronomists, Division of Plant Industry, have been able to promote and conduct many more demonstrations on farmers' properties than in the past. Facilities and equipment made available under the Agricultural Extension Grant or the Dairy Industry Extension Grant have made the difference.

Field assistants, each provided with a utility truck, are attached, as Grant employees, to various country offices of the Department. These field assistants now totalling seventeen, have helped district officers in establishing and conducting Agricultural Extension Grant demonstration projects. They have also relieved the district officers of various routines, freeing the more highly trained officers' time for other extension activities.

Activities—Far North Coast Region.

Liaison with Research.—The need for basic research into problems peculiar to the sub-tropical far north coast areas, is limiting the effectiveness of extension. Development of animal nutrition research at Wollongbar Experiment Farm, establishment of the Tropical Fruit Research Station at Alstonville, extended operations at the Terranora Vegetable Demonstration Plot, and current research at the Duranbah Demonstration Plot, are destined to meet that need.

Regional Advisory Committee.—Regular meetings of the Advisory Committee were held at Lismore and Grafton. The Committee is at present sponsoring a survey of various farm practices within the Region. Active interest continued in the practicability of an Artificial Stock Breeding Centre at Lismore. Following a visit by the Chairman of the New South Wales Milk Board, an artificial breeding centre is expected to be in operation on the far north coast by the end of 1956.

Conferences and Schools.—Annually a farmer refresher course in animal husbandry and pasture management is held in the Region. This course, usually of three to four days, was held in Grafton in 1955, and has been arranged for Macksville for 1956. The refresher courses are welcomed by farmers. Daily attendance at the 1955 course averaged sixty persons.

Conferences of extension officers, of particular Divisions, were held and as particular problems (butter quality, flood relief, insect pests, etc.) arose. The annual conference of all extension officers in the Region was held in August at Lismore. The past twelve months' activities were discussed and plans were made for the following year.

The Richmond River Research Council, consisting of farmers and other residents of the far north coast, has been active in the development of pasture research. A Sydney University—Department of Agriculture research team has been in operation. Considerable investigational work has been carried out on soil types and pasture improvement management. Conferences between extension officers of the Region and members of the research team have been held, to assure the desired link between research and extension.

Flood Relief Investigations.—Officers again were required by flood circumstances to investigate applications by farmers for relief. Major floods were experienced in February, 1956, in the Clarence, Richmond, and Tweed River basins; 200 applications for flood relief were investigated.

Publicity.—300 press releases were made formally. These, and 22 straight broadcasts, were also made available to radio stations. In addition, many items were given informally to the press and radio by officers in the Region.

The press clipping service at Lismore showed that some 90 per cent. of the publicity releases appeared in regional newspapers without alteration, and 30 per cent. of them in rural weeklies published in Sydney and Brisbane. Random checks on broadcasts, and assurances by the announcers, indicated not only that all specially prepared radio talks were used, but that 90 per cent. of the press releases were also used on the air in news or other sessions.

Agricultural Bureau Development.—The publicity officer for the Region actively assisted branches of the Agricultural Bureau on the far north coast and helped to inaugurate four new branches.

Prior to establishment of the Region there was, in recent times, no active Agricultural Bureau branch north of the Clarence River. Now there are sufficient active branches to establish their own Bureau Division and to have a Councillor in the State Advisory Council of the Agricultural Bureau.

Farmers' Competitions.—Farmers' competitions played a part in the extension services. Competitions conducted by agricultural show societies in conjunction with the Royal Agricultural Society and competitions conducted by the Department of Agriculture in co-operation with other organisations were judged by Regional officers. Pasture, crop, and stock competitions were conducted. The latter included eight Pig Carcase Competitions.

The Lismore "Northern Star" newspaper gave prize money for a Pasture and Herd Improvement Competition sponsored by the North Coast Agricultural Society in association with the Department of Agriculture. The competition attracted 47 entries. A similar successful Pasture Competition, with prize money subscribed by the Grafton *Examiner* newspaper, was conducted and judged by Regional officers.

War Service Land Settlement.—112 estates have been submitted within the Far North Coast Agricultural Region for War Service Land Settlement. All were inspected by Regional agronomists in association with officers of the Department of Lands.

Dairy Industry Extension Grant Demonstrations.—Forty pasture demonstrations established in the Region during 1954-55 were continued. Forty new demonstrations were planned for 1955-56, but because of the abnormally wet conditions only 14 were established. A baled grass silage project at Dorrigo was the first demonstration of its kind on the far north coast.

A caterpillar plague in the Lismore district during the 1956 autumn provided material for 17 demonstrations on farmers' properties, to show farmers how to control the pest. Demonstration areas ranged from 10 to 25 acres, with a total of 220 acres treated.

Activities—South Coast and Tablelands Region.

Liaison with Research.—A research agronomist of the Division of Plant Industry, located at Berry, is doing a considerable amount of pasture research in south coast districts. The work is closely followed by extension officers, and many of the results have been used to advantage.

An organisation known as the Berrima District Farm Advancement League, with headquarters at Moss Vale, has been inaugurated by local people. It is pressing for research specifically in the Berrima district. Meetings of the committee of the league attended by the Regional Supervisor and others have formulated plans for the conduct of demonstrations of an applied research nature in the district.

Regional Advisory Committee.—The South Coast and Tablelands Region Advisory Committee, convened by the Minister, held its inaugural meeting in November, 1955, and first business meeting in March, 1956. The Committee has interested itself in a number of problems associated with such matters as farm economics, reafforestation, windbreaks, and improvement in beef and dairy cattle.

Conferences and Schools.—Conferences of district officers of the Region were held as required, at the Regional headquarters in Goulburn.

Serrated tussock is a special weed problem on the central tablelands, and the Regional Supervisor with some of his agronomists attended conferences convened by Shire bodies and others to formulate ways and means of dealing with the weed's encroachments.

A Pasture and Animal Husbandry School was held at Murrumbateman during May, 1956. This was a four days' School, with speakers from Commonwealth and State Departments, and private institutions; forty farmers attended. Indoor talks were supplemented by demonstrations on neighbouring properties. The School was organised by the Regional staff in conjunction with the Murrumbateman Agricultural Bureau.

Publicity.—The expansion of agricultural extension per medium of the press and radio is considered to have been the most important single advance made since the Region was established.

The country press in the Region has reacted very favourably to the stepping-up of the output of statements on agricultural matters. In addition to a big volume of formal press releases, and release of monthly reports and brief personal contributions by field officers, a weekly column of short topical items was commented. Most newspapers in the Region

are using the latter as a regular column or, in part, as "filler pars". Examination of clippings shows that most of the material issued has been published by Regional newspapers.

Sponsored farm radio sessions on commercial stations are in operation, and material is regularly provided also for farm broadcasts over the A.B.C. Stations at Bega and Canberra. All radio stations in the Region receive copies of press statements issued by the Regional headquarters.

Field Days and Meetings.—Field Days were held in many parts of the Region to demonstrate improved farming methods. Twenty-two large-scale field days were conducted, five primarily concerned with animal husbandry and the remainder with pasture management and fodder conservation. Many small field gatherings of relatively informal origin were held by individual officers.

The cine and slide film projectors, with up to date films and slides, provided valuable variation to the ordinary talk or lecture at meetings. Twenty-four talks, in addition to addresses at field days, were given by district officers at night meetings of farmers. These talks in most instances were supported by cine films.

Agricultural Bureau.—Members of the Regional staff actively assisted Agricultural Bureau branches and as often as possible attended meetings. Assistance was given to branch Secretaries in arranging their annual field days and conferences, and in drawing up their programmes of meetings for twelve months.

The Pasture and Animal Husbandry School, initiated by and organised in collaboration with the Murrumbateman branch of the Agricultural Bureau, held over a four-day period in May, 1956, was a good example of the close co-operation between the Regional staff and farmers' organisations.

Farmers' Competitions.—Competitions arranged by various bodies including the Royal Agricultural Society, New South Wales Milk Board, Farmer & Settler Newspaper, Rural Bank, Australian Broadcasting Commission, Agricultural Bureau, country agricultural show societies, and Junior Farmers' Clubs were judged by members of the Regional staff. The extension value of the judgments was particularly apparent where local farmers attended the judging in the spirit of an informal field day.

Dairy Industry Extension Grant Demonstrations.—Fifty demonstrations, mostly dealing with pastures and their management are located on farms in the south coast and Moss Vale districts; under the Dairy Industry Extension Grant. These demonstrations in the main have been very successful, some farms showing a striking increase in production. Field days and farm walks have been an effective feature of these demonstration projects.

Agricultural Extension Grant Demonstrations.—The appointment of two field assistants to the Region enabled district officers on the southern tablelands to increase considerably their field demonstration projects; fifty-eight demonstrations are now in operation under the Agricultural Extension Grant. Most are on management and establishment of pastures. Ser-rated tussock control, mainly by the sowing of improved pastures and proper management, is prominent in the demonstrations.

A Beef Cattle Improvement Programme built around the culling and selection of female breeding stock based on their mothering ability as assessed by the weaning weight and quality of their offspring, and the selection of bulls on a weight for-age basis, is another type of demonstration project. This is in operation on two properties on the southern tablelands.

Activities—Southern Region.

Liaison with Research.—There has been close liaison between the Regional establishment and the Wagga Agricultural College and Experiment Station, Wagga Agricultural Research Institute, and Temora Experiment Farm, for co-ordination of research and extension within the Region.

A survey of a sampling of the pastoral properties in the eastern portion of the Region was carried out by officers of the Division of Marketing and Agricultural Economics of the Department of Agriculture, in co-operation with Regional extension officers and Rural Bank Valuers, in 1954, to ascertain the production potential and factors affecting achievements; 150 properties were visited in the survey. The survey is reported also under "DIVISION OF MARKETING AND AGRICULTURAL ECONOMICS".

Results of the survey have been published, and are also being used in extension programming within the Region.

Regional Advisory Committee.—Four meetings of the Advisory Committee were held. The Committee sponsored a Pasture and Animal Husbandry short-term School for Farmers at

Wagga Agricultural College; the pastoral industry survey in the eastern portion of the Region; proposals for appointment of an additional sheep and wool officer and an economics research/extension officer to the Region; survey of the pome fruit and prune industries in the Batlow and Young district respectively; production, distribution, and utilisation of registered cereal seed; demonstrations of lamb carcass grading; improvement to weather forecasting services; amendments to the scale of points and methods of judging of the Royal Agricultural Society Field Wheat Championships; and matters dealing generally with agricultural problems of the Region.

Conferences and Schools.—Conferences of district officers of the Region were held as required, with particular attention to subterranean clover seed production and the organisation of seed certification services for the increased area submitted for inspection.

The Pasture and Animal Husbandry School conducted in co-operation with the Wagga Agricultural College in June, 1956, of four days' duration was limited to fifty farmer-students; but applications were received from 130 farmers. It has been planned that this shall become an annual school.

Publicity.—Officers in the Region have increasingly appreciated the value of press and radio publicity in their extension programming. Additional to many personal contributions by officers, 240 formal statements were issued to the press by the Regional office, whilst 127 radio broadcasts were made.

Extracts from publications, and brief notes prepared by district officers, have been roneoed for local distribution to coincide with seasonal needs. These roneoed "briefs" have proved popular with extension officers, primary producers, and merchants. The latter have keenly sought sufficient copies to distribute to farmers purchasing pasture seed, etc.

The Region staged an effective exhibit at the Wagga Show; and co-operated in the Public Service Board exhibition at the Careers and Hobbies Exhibition promoted during Cootamundra's "Festival of Youth" week.

Field Days.—Some large-scale field days at which the attendance ran into hundreds were held in co-operation with farmers' organisations, but the more favoured type of field day for extension effectiveness was where the attendance was smaller. Examples of the latter were the many field days in conjunction with judgments in such competitions as "Fat Lamb Carcase", "Beef Cattle Carcase", "Merino Ewe Breeders", "Farm and Fodder", "Beef Cattle Breeders", "Fat Lamb Ewe Breeders", and in connection with specific orcharding, dairying, pasture improvement, sheep classing, etc., practices.

The Mobile Mechanisation Unit, with a demonstrator, located in the Region, is fully equipped to demonstrate tractor and farm machinery maintenance. The thirty field sessions held with this unit throughout the year were popular with farmers.

Farmers' Competitions.—Competitions in connection with beef cattle, sheep, fat lambs, pigs, dairy farms, wheat, maize, and pastures, were judged by Regional officers. Many of the officers also judged at country shows, and some acted in a similar capacity at the Royal Agricultural Show, Sydney. Considerable time at certain periods has been taken up in competition judgments but officers have endeavoured to extract the utmost extension effectiveness from time so spent.

Agricultural Extension Grant Demonstrations.—The appointment of a field assistant, with transport, to the northern portion of the Region, enabled officers to increase the number of Agricultural Extension Grant demonstrations in the Southern Region; seventy-five demonstrations on farmers' properties have been established or arranged. These in the main deal with phases of pasture management, particularly superphosphate application rates, and fertility of orchard soils in the Young district. Field days were held on the demonstrations at appropriate times.

The Mobile Mechanisation Unit, another Agricultural Extension Grant project in this Region, has been mentioned earlier in this report. The demonstrator's thirty machinery demonstrations to groups of farmers, apart from his talks and film evenings, included engine overhaul; maintenance of fuel, ignition, and lubricating systems of tractors and engines; maintenance and operation of tillage and harvesting machinery; proper use of workshop equipment and tools; electric welding; soldering; blacksmithing; and general farm machinery protection and maintenance.

Public Relations, General.—The Regional Supervisor conducted a party of International Wool Textile Conference delegates on a south-western tour, from Canberra to Deniliquin. As a member of the Murrumbidgee Regional Development Committee, he accompanied other members on an inspection of the M.I.A. and adjacent districts in which water from the Snowy River is to be used. Certain district officers are

members of the Murrumbidgee, Upper Murray and Lachlan Regional Development Committees. Their advice on agricultural matters has been appreciated.

The Regional Supervisor has been appointed a member of the Wagga District Technical Education Advisory Committee.

Fifteen prominent Indian farmers spent a week in Wagga and were conducted over the Agricultural College, the Research Institute, and throughout the district, by Regional staff.

War Service Land Settlement.—Estates were inspected in association with officers of the Department of Lands and members of the Closer Settlement Advisory Board. The fruit inspector at Batlow continued as Supervisor of the "Willigobung" Estate where returned servicemen settlers are establishing orchards.

Activities—Western Region.

Liaison with Research.—Western Regional staff closely co-operated with the staff of the Trangie Experiment Station, Bathurst Experiment Farm, and the Science Services of the Department. Potato investigations, serrated tussock research and demonstrations, plant nutrition trials, and apple black spot eradication featured the liaison.

An area of 40 acres has been leased in the Rockley district for investigations into serrated tussock control by a team consisting of Bathurst Experiment Farm and Regional agronomists.

Advisory Committee.—Three meetings of the Western Agricultural Region Advisory Committee were held. Subject matter included pasture improvement and management, control of serrated tussock, transport of stock, and irrigation from the Macquarie and other rivers.

Schools.—Mitchell Division of the Agricultural Bureau and the Department of Agriculture collaborated to promote another Leadership School at Wolaroi College in January, 1956.

A school for Regional officers was held in the Rockley area early in 1956 in respect to serrated tussock advice to landholders.

Flood Relief.—Floods arose from the Belabula, Lachlan, Bell, Macquarie and Cudgegong rivers. Regional staff helped local committees, and investigated flood relief claims. Some acted as observers in aircraft, dropping fodder to marooned stock.

Publicity.—Regular farm broadcasts continued at a high rate in association with the six radio stations in the Region. The broadcasts have increased five-fold on the sixty broadcasts given in 1953-54, and ten-fold by taking into consideration the repeat broadcasts of tape-recorded items. Moreover, their popularity has resulted in radio stations arranging sponsors and very favourable times for the broadcasts.

Four hundred and fifty-six statements were released to the press, and the press made greater use of the releases than in previous years. The "Weekly Notes" have been particularly favoured, especially by the smaller newspapers in the Region.

Field Days.—Forty field days were conducted in the Region, some in co-operation with farmers' organisations. The district veterinary officer in association with Regional officers conducted several field days in a campaign for control of foot rot in sheep.

The 4th Annual Machinery Field Day at Orange in November, 1955, was of two days' duration. The overall attendance was estimated as 12,000. Regional staff co-operated with the organising committee and operated an information stand on the Ground.

Agricultural Bureau.—Bureau field days and meetings were assisted by programming, publicity, and officers' attendance. New branches were formed, one at Burruga with the immediate object of getting landholders in that district interested in the control of serrated tussock.

Farmers' Competitions.—Officers judged at practically all local shows in the Region, and judged field competitions conducted by the Royal Agricultural Society and other organisations.

Agricultural Extension Grant Demonstrations.—The appointment of field assistants, with transport, at Bathurst and Dubbo eased the stress on officers in the Region in organising and managing demonstrations, projects; forty-six demonstrations under the Agricultural Extension Grant are established in the Region, practically all dealing with pastures and their management. Serrated tussock control is of course an important feature.

A project very important to orchardists is that in the Yetholme district to show that black spot of pome fruit can be eradicated.

Public Relations, General.—Officers had close personal contact with farmers' organisations, show societies, and other Government departments, and with many citizens' organisations in the town, as well as the press and radio.

Additional co-operative activities included the inspection of agricultural activities at aboriginal stations, the mental hospital, and gaol; agricultural advice and assistance to the Fairbridge Farm School, Scots and All Saints Colleges, Bathurst, Wolaroi College and the Orange Technical College; attendance at meetings of Junior Farmers, judging of their competitions, and assistance in the selection of New South Wales Champion Junior Farmers; co-operation with flood Emergency Services; inspection of properties for War Service Land Settlement, sixty-three estates inspected; close contact with the Mitchell Regional Development Committee; assistance to the Area Supervisor of Technical Education in drawing up a syllabus for agricultural courses at the Orange Technical College; and attendance at meetings of, and advice to, the Orange Youth Welfare Advisory Committee and the Bathurst Advancement of Agricultural Education Society.

CO-ORDINATED EXTENSION SERVICES.

The Co-ordinated Extension Services, inaugurated by the New South Wales Food Production Committee in 1952, continued to operate.

Co-operating Organisations.—The participating organisations, and the respective number of officers concerned, are:—

Department of Agriculture	114
Soil Conservation Service	67
Rural Bank of New South Wales	27
New South Wales Milk Board	24
Total	232

The field officers of the organisations concerned have been directed by their respective Head to assist one another in extension service to primary producers "to the limit of personal competence."

The district agronomist of the Department of Agriculture, of whom there are thirty-two located in country centres, is the co-ordinating officer for the respective district.

Progress of the Scheme.—There is much closer co-operation between officers than was the case prior to formulation of the Co-ordinated Extension Services in 1952. Officers of the Department of Agriculture, primarily recognised as the agricultural extension organisation in New South Wales, have been ably supplemented by soil conservationists, Rural Bank valuers, and Milk Board supervisors; the men in these categories giving specific information, within their particular subject fields, to individual farmers and at meetings, but also serving as extra points of contact for advice previously treated as the province of the Department of Agriculture.

Agricultural Advice by Officers.—To help make more effective the policy which requires all officers to give agricultural advice, irrespective of the field, to the extent of their competence, the officers in the system are supplied with the *Agricultural Gazette*, *Soil Conservation Journal*, *Rural Bank Trends*, and the *New South Wales Milk Board Journal*, and appropriate leaflets and pamphlets of the Department of Agriculture. The District Co-ordinator (agronomist) receives a copy of every new or revised Department of Agriculture publication. On sighting such a publication he may elect to secure additional copies, for distribution amongst officers in the local group. Regular, monthly Department of Agricultural "Crop Notes", "Horticulture Notes", "Dairying Notes", etc., are also forwarded direct to the Co-ordinating officer.

Milk Zone Production Advisory Council.—The Production Advisory Council was inaugurated by the New South Wales Milk Board in the early stages of the Co-ordinated Extension Services scheme, to encourage co-operation between farmers in the Milk Zone and officers participating in the scheme. The Council includes representatives of the Milk Board, Department of Agriculture, Rural Bank, Department of Conservation, Junior Farmers' Council, Factory Managers' Association, the Agricultural Bureau and various other primary producer organisations. It has continued to meet regularly, and has expanded its activities to include the promotion of competitions for dairy farmers. One such competition has been based on feeding to increase milk production.

There are twenty-five Production Advisory Committees in the Milk Zone. These deal with decentralised business, at district level, and through them many field days have been

arranged. Four district conferences of these committees were held during the past twelve months. The excellent liaison between Milk Board supervisors and other agricultural officers in the scheme, has been illustrated by the reports of field days and meetings in the monthly Journal of the New South Wales Milk Board.

Milk Board supervisors in the past year promoted 43 field days in collaboration with other officers; 132 agricultural talks and film screenings for farmer gatherings; and gave extension advice to 1,241 dairymen in the Milk Zone.

Reports by District Co-ordinators (Agronomists).—The reports of various District Co-ordinators respectively indicate that "the scheme is working quite smoothly", "co-operation of officers in the scheme has been continued", "co-ordination has prevailed throughout the year with all services being interested in joint extension activities", "full co-operation existed between the Soil Conservation Service, Rural Bank officers, and the Department in this area", "the assistance of co-operating officers, particularly the District Soil Conservationist, is acknowledged in the conduct of interesting and balanced field days", and "the Co-ordinated Extension Services scheme has continued to operate in a satisfactory manner, with all co-operating officers assisting in agricultural extension work and giving advice of a varied agricultural nature", etc.

Reports of District Co-ordinators on file in the Department of Agriculture include illustrative detail of co-ordinated activities.

AGRICULTURAL EXTENSION GRANT.

The Commonwealth Government allocated £300,000 to the Agricultural Extension Services Grant in 1955-56, and £75,000 of that total was available to New South Wales. This was an increase of £25,000 on the £50,000 made available each year since the Grant was inaugurated in 1952-53.

The Commonwealth has determined that the Agricultural Extension Services Grant will continue until 1959-60, and before the end of the period a decision will be made as to whether it will be extended beyond that year.

Criteria for Eligibility of Projects.—A broad basis used in determining the eligibility of projects for finance under the Agricultural Extension Grant has been:—

- (a) A Project should give promise of an early increase in the production of commodities for which production aims have been set by the Agricultural Council, or for which there is an overseas export (excluding projects which relate primarily to wool and dairy production for which funds are available from other Commonwealth sources); or
- (b) The Project should contribute to a rapid increase in the efficiency of production of those commodities referred to in (a).

The Australian Agricultural Council agreed that State Departments of Agriculture should carry out certain field investigations essential to the maintenance of an efficient extension service. Such field investigation projects are eligible for finance from the Grant provided they meet the requirements of (a) and (b) above.

Funds from the Grant have been used in the main for field demonstrations on farmers' properties, but with Commonwealth approval have also been used to finance the training of personnel, to finance the employment of officers and assistance essential to the certain projects, finance visits overseas by State officers, and to finance the purchase of general extension aids equipment.

Staff and Agricultural Trainees.—The following are provided under the Agricultural Extension Grant:—

- Two editorial assistants.
- Four publicity officers in Agricultural Regions.
- One fruit packing instructor.
- One Italian extension liaison officer.
- One assistant for Photo Copying Apparatus.
- One demonstrator for Mobile Mechanisation Unit.
- One administration assistant.
- Nineteen field assistants.
- One farm hand.

The Grant also provides for the following Departmental traineeships at Universities and Colleges:—

Sydney University—Veterinary Science trainees	16
Sydney University—Agricultural Science trainees	9
Armida University—Rural Science trainees ...	2
Hawkesbury Agricultural College—Diploma Course trainees	8
Wagga Agricultural College—Diploma Course trainees	6
Total	41

Projects.—Seventy-two projects are being conducted under the Agricultural Extension Grant, and amongst the consequent undertakings are 500 demonstrations on farmers' properties. These aim to show in a practical way, methods of maintaining soil fertility, recommended pasture improvement and management practices, modern crop husbandry techniques, improved orchard practices, developments in livestock production, and other principles that have been successful.

Throughout the reports of the various Divisions in this Annual Report of the Department, there are frequent references to the Agricultural Extension Grant projects. Each project has been subject of an individual report, on file in the Department.

DAIRY INDUSTRY EXTENSION GRANT (*see under "DIVISION OF DAIRYING"*).

HAWKESBURY AGRICULTURAL COLLEGE.

Student Enrolment.—The enrolment was ten more than the record enrolments of 1953 and 1955. Admissions to Agriculture I were seven less than the 1955 record, but only because of increased intakes for Dairying I and Food Technology I. Enrolment comparisons at the commencement of the first session were as follow:—

Course.	1954.	1955.	1956.
Agriculture—Third Year	55	55	63
Agriculture—Second Year	63	72	69
Agriculture—First Year	72	73	66
Dairying—Second Year	9	6	8
Dairying—First Year	7	9	16
Food Technology—Second Year	4	5	4
Food Technology—First Year	6	4	8
Totals	216	224	234

Twelve of the students are from other States or overseas, whilst 54 per cent. are from New South Wales country districts. The admission from Agricultural High Schools in 1956 was seventeen.

Of the ninety-nine students admitted in 1956, forty-one (41 per cent.) had gained the high school Leaving Certificate, nineteen (19 per cent.) had completed the fifth year but failed in the Leaving Certificate examination, and twelve (12 per cent.) had completed fourth year at high school.

It was possible this year to admit to the Agriculture diploma course all eligible applicants who had applied before June, 1954. Applications for admission to the diploma courses in Dairying and Food Technology showed notable increases.

Diploma Examinations.—Fifty-four students were successful in the 1955 final examinations, a further two being successful, at the deferred examinations held in April, 1956. Of the Diplomas in Agriculture, three were at Honours standard, including one First Class Honours. Five students completed the Dairying diploma course, three at Honours standard. Five completed the Food Technology course, one at Honours standard.

In and as from 1956 successful Dairy students will be awarded the Hawkesbury Diploma in Dairy Technology and not the Hawkesbury Diploma in Dairying as previously.

Ex-Students.—The total of students since the inception of the College, including those in residence, is 5,240. The proportion following vocations appropriate to their agricultural training is estimated at 78 per cent.

Extra-curricula.—The Student Representative Council, The Sports Club, The Debating Society, The Dramatics Club, The Camera Club, The Student Christian Movement and the College Branch of the Agricultural Bureau helped to promote the social life and welfare of the College.



New Dairy Technology School.

At Hawkesbury Agricultural College on 27th October, 1955, the Hon. E. H. Graham officially opened the new Dairy Technology School and Dairy Produce Factory.

The Factory for student training is equipped to manufacture cheese, butter, ice cream, condensed milk, spray and roller dried milk, and to pasteurise and bottle milk for the nearby towns.

(Photo from Head Office Library.)

Sixteen students were enrolled in a Life Saving Class and were examined by the Australian Life Saving Society. Nineteen awards were obtained.

Rifle shooting and tennis teams took part in the Inter-collegiate contests held at Gatton Agricultural College, Queensland.

The College debating team took part in the Intercollegiate competition sponsored by the Australian Broadcasting Commission.

College Library.—The College library has continued to expand steadily. During the year 187 new books and fifty-nine bound periodicals were added to the stock, making a total of 2,367 books and 1,025 bound periodical volumes.

A check on library usage showed an increase over last year of approximately 14 per cent.

To ensure that adequate finance is available for the purchase of new books, a fee of 10s. per student per session was introduced at the beginning of 1956.

Student Tours, Visits.—Senior students in Agriculture visited the M.I.A. for instruction in irrigation techniques. They also visited northern agricultural districts, as well as a number of properties in the County of Cumberland. Senior Dairy students made the annual tour of Hunter Valley dairy factories and of major dairy product and cold store establishments in the metropolitan area. The first year Dairy students attended a Dairy Science school at Grafton. All Food Technology students were conducted on inspections of commercial canneries and the Second Year class visited the M.I.A. during fruit harvesting and processing. This class also spent several days at Gordon Edgell and Sons Limited, Bathurst, to gain commercial experience of vegetable processing.

Students visited the Sydney Royal and the Sheep Show for educational purposes, including experience as stock attendants and/or competitors in stock judging.

University Undergraduate Courses.—During the second half of 1955 the College regularly provided practical demonstrations in livestock husbandry and agricultural machinery matters for students in the 2nd Year of the University of Sydney Faculty of Agriculture. These students visited the College one day each week.

Arrangements as from the beginning of 1956 have been altered in that these students will now obtain part of their practical demonstrations at Wagga Agricultural College but will still visit Hawkesbury College on seven days during the year for a sequence of pasture and livestock work and for some demonstrations not so readily available at Wagga.

Farmers' Schools, Conferences, Field Days, etc.—Winter schools for farmers were conducted respectively in dairy farming, poultry farming, pig farming and tractor maintenance. Schools in vegetable growing and poultry farming were provided for Junior Farmers. The Summer School in Apiculture was also conducted. The annual Poultry Field Day, a Pasture and Irrigation Field Day and a Junior Farmer Field Day were held, with a large attendance in each case.

The 31st Annual State Congress of the Agricultural Bureau of New South Wales and a Leadership School for members of the Agricultural Bureau, the Country Women's Association and other rural organisations, were held at the College in the winter vacation.

The College facilities were made available to the Society of Dairy Technology for a residential conference.

The Australasian Conference of Plant Pathologists was held at the College in the winter vacation, as well as a conference of cereal plant breeders.

A school for field assistants employed under the Agricultural Extension Grant, and one for Dairy Factory Apprentices, were conducted.

Buildings, etc.—The School of Dairy Technology was practically completed, and was officially opened on 27th October, 1955. An extensive programme of building, and alterations to existing buildings, was completed in the Poultry Section. A further building programme in this section is now almost completed, on funds from the Commonwealth Agricultural Extension Grant. Two new glasshouses were completed, and a heating system was installed in the vegetable breeding glasshouse. Construction of a hay and grain drier at the River Farm was completed. At the Pig Section, the farrowing pens have been renovated and a deep litter shed is being erected. New bull sheds and yards are in course of construction.

A start has been made on the installation of a new P.A.B.X. telephone system.

Minor work included subdivision of the Agronomy Offices, extensive renovations to one of the cottages, replacement of stairs in the old accommodation blocks, installation of new calf-feeding stalls and a grain silo at the Cattle Section.

Extensive damage occurred to power lines, fences, and a number of buildings, during a hurricane in March, 1956. Power lines have been restored and steps taken to effect repairs to fences and buildings.

A new refrigeration unit was installed at the kitchen and a new boiler is in the process of being installed.

Changes in Curriculum.—With the appointment of an additional Lecturer in Agriculture, some re-organisation of practical work carried out by students is taking place whereby it is anticipated that all students will obtain a more thorough understanding of the various operations in each College section. For practical agriculture examinations the reaper and binder has been eliminated and the pick-up hay baler included; the combine and power mower have been added.

Agricultural Engineering has been included as a final year subject as from 1956.

Apiary, previously included as part of Entomology, has been made a separate subject.

Meat processing has been added to the Food Technology course. Previously, only fruit and vegetable processing were included.

Sectional Operations at Hawkesbury.

College Farm.—Ninety tons of wheaten and oats hay were harvested from 200 acres. The quality of the wheaten hay was very good, but prolonged rain during the oat crop harvest caused heavy losses. Only 9 bushels per acre of wheat, oats and barley off 40 acres were harvested. One hundred and forty acres sown to cereals failed completely, due to water-logging, and 50 acres were grazed. No ensilage was made, as the 25 acres of maize and sorghum sown for its production were a total loss because of the February, 1956, floods. At 30th June, 1955, 100 tons of cereal hay and 60 tons of lucerne and pasture hay were on hand. Ten acres of sorghum were sown for fodder purposes, but failed. Sixteen acres of lucerne and red clover were sown at the River Farm in 1955, but this area was destroyed by floods just as it was coming into production. A further 6 acres of lucerne and 23 acres of red clover have been sown. Only 10 tons of lucerne and red clover hay were conserved, due to excessive rain and floods.

Pastures grew satisfactorily throughout the year, though excessive rain during the summer caused rank growth. The area of pastures sown in the autumn of 1956 was 43 acres. Practically all of this area can be irrigated. As a result of heavy applications of fertiliser last year an excellent response has been obtained from subterranean and white clovers in all paddocks. Thirty-three acres of established pastures have been top-dressed, and it is proposed to top-dress a further 218 acres in the near future.

Approximately 10 tons of potatoes were harvested from an area of 1½ acres. The pumpkin crop was destroyed by floods.

A number of major fencing jobs were completed during this year, including the River Farm boundary and a number of boundary fences on the main College farm.

A 4,000 cubic yard storage dam was constructed in the dairy lane for irrigation purposes. A ring tank of 200 yards diameter, with a 6,000 cubic yards catchment dam outside it for storage and pumping, with combined storage for 13,000,000 gallons of water, are under construction. It is intended to use this stored water to irrigate pastures for the College dairy herd.

Seventy acres of land in Rickaby's Creek paddock which were previously windrowed, were sown to oats.

Seven new tractors were received on loan from machinery firms to replace earlier models. In all, twenty-three items of machinery apart from tractors were acquired, either on loan from firms or by purchase. Tractor firms again helped to make a success of the winter school on tractor maintenance.

Orchard Section.—A dry spring and early summer, followed by extremely wet conditions from mid-summer to early winter were reflected in irregular yields, particularly in the orange crop. Mandarins yielded very well and grapefruit were generally good. Stone fruits, particularly peaches, gave good yields. The pear crop was very light. The grapes and persimmons carried excellent crops but no fruit was harvested due to wet weather damage.

Wet conditions necessitated a heavy spraying programme to control fungus diseases. Crown gall infection of berry fruits resulted in the loss of a number of stools. Fruit fly was well controlled.

The trifoliata hedge yielded approximately 60 pounds of seed for citrus stock purposes. A new pump was installed at the Yarramundi tank and a trial irrigation given to the citrus stock area. The nursery trees in the citrus arboretum have made very good growth, especially the lemon varieties.

Over 50,000 super feet of case timber were obtained from the pine plantation as an aftermath of the hurricane in March, 1956. Preparation has been made to replant the area.

Cannery and Food Technology.—Hand-operated pitting equipment for clingstone and freestone peaches and apricots was obtained. Weather interfered with fruit and vegetable supplies and only limited quantities of clingstone peaches and prunes were available. Floods destroyed plantings of sweet corn and some tomatoes, and prevented the sowing of cauliflower and beans.

Vegetables processed included 8,445 lb. of canned and 3,582 lb. of quick frozen packs, as well as 478 lb. of dehydrated peas. Vegetables processed included asparagus, beans, carrots, cauliflower, beetroot, peas, tomatoes and mushrooms. Fruit processed consisted of 8,254 lb. of canned and 2,799 lb. of quick frozen packs; apples, apricots, bananas, grapefruit, peaches, pineapples, prunes and plums being the fruits treated. The cannery supplied 8,314 lb. of jam; meeting the College requirements. For the first time meat was processed; 590 fowls being quick frozen.

School of Dairy Technology.—The opening of the new School of Dairy Technology in October, 1955, has uplifted the Dairy course from a practical training angle and to a lesser extent from the theory aspect.

Sixteen students entered the course, compared to eight in the previous year. The increase is due to the improved facilities for instruction, in the new School, and to the inauguration of the Dairy Apprenticeship Scholarship Scheme.

The College has commenced operations as an agent company of the New South Wales Milk Board. Milk is received direct from suppliers on behalf of the Board; pasteurised, bottled, and distributed to vendors in the Windsor, Richmond and Kurrajong areas.

Second year students competed in the annual grading competition conducted by the Dairy Factory Managers and Secretaries with considerable success. First year Dairy students attended a Dairy Science School at Grafton, and all obtained the certificates required by the Dairy Industry Act.

Dairy Research Section.—Only limited work was possible, because of the need to establish the control laboratory in the School of Dairy Technology. An additional Dairy Research Officer was appointed late in the year, to work on milking machine efficiency. Two papers were published in the *Agricultural Gazette* during the year.

Poultry Section.—At 30th June, 1956, the stock totalled 1,401 and egg production 20,656 dozen.

Winter Schools for poultry farmers and Junior Farmers were conducted, as well as the annual Poultry Field Day.

Breeding operations were carried out with White Leghorns and Australorps. Turkeys, ducks and geese were also bred in limited numbers.

The College is participating in the *Poultry Improvement Plan (Eggs)* sponsored by the Commonwealth Government. As the initial breeding stock, ten pens each of White Leghorns and Australorps have been mated. To provide facilities for this Improvement Plan a 4,200 egg incubator has been installed and thirty-six colony cages, in a prefabricated shelter, two rows of testing pens, and an intensive house, have been erected.

The 54th *Egg Laying Competition* concluded on 22nd March 1956. Results were well below average, due mainly to the supply of two large batches of a Vitamin A and D₃ supplement which were less than one quarter of their stated potency. Infectious laryngotracheitis occurred in the Single Pen Eggs Laying Competition and all birds in the section were immunised.

The *Third Random Sample Test* concluded on 31st March, 1956. Results were below those of the previous two tests, for the same reason as the below average results in the Egg Laying Competition. The *Fourth Random Sample Test* commenced on 17th August, 1955. Results to 30th June, 1956, are excellent.

Sheep and Wool Section.—The stock is comprised of a Romney Marsh Stud (eighty-four head); ration sheep; and a commercial flock (519 including seventy-two rams). Lambing in the commercial flock was very good, 110 per cent. of the lambs being marked.

Weather conditions made flock management very difficult, favouring foot troubles and internal parasites. Jetting with aldrin very effectively controlled fly strike. Fly strike prevention tests continued, using various insecticides, and some useful results have obtained.

The shearing shed erected last year is being well equipped and is proving most useful in flock management and student instruction.

Third year Agriculture students undertaking Stage II of the Wool Classing course maintained a high standard. Second year Agriculture students undertaking Stage I of the course also obtained very satisfactory results.

Apiary Section.—There were thirty-eight hives at 30th June, 1956, forty hives at the River Farm having been destroyed by floods in February. Honey yield was 1,330 lb. Good conditions for bees prevailed during the first half of the twelve months under report, but excessively wet conditions during the latter half adversely affected apiary operations. Colony population was seriously depleted in the hives not destroyed by floods.

A trial to determine the effect of antibiotics on noseema disease of bees was commenced, but floods destroyed the hives before results could be obtained.

One hundred and twenty queen bees were distributed to beekeepers throughout the State. One package of bees was air-freighted to Ceylon.

College bees and some of the extracting equipment were again used at the Live Bee and Honey Extracting Demonstration at the Sydney Royal Show.

A Summer School in Apiculture was conducted.

Piggery Section.—Breeding stock at 30th June, 1956, comprised nine boars (three each of Tamworths, Berkshires and Large Whites) and twenty-three sows (eight each of Tamworths and Large Whites and seven Berkshires). The demand for stud stock improved considerably and there have been insufficient stud pigs available in recent months to meet it. Stud sales were forty-five head compared to thirty-seven head in 1954-55.

Renovations of the farrowing pens were completed, and a new water supply installed. The wooden creeps were replaced with metal. Metal feeding stalls have been constructed for use by brood sows. The old weaning pens have been demolished and a new deep litter shed is being erected in their stead. A kerosene operated infra-red heating device has been installed in one farrowing pen as an adjunct to the electric infra-red lamps installed last year.

Litter testing has commenced, and also trials of the effect of large amounts of copper salts in rations.

A School for Pig Farmers was conducted in June, 1956.

Cattle Breeding and Management Section.—A School for Dairy Farmers was conducted in June, 1956.

The Jersey Stud at 30th June, 1956, totalled ninety-two, including six bulls on loan to farmers. The Friesian stud totalled 104 head, including six bulls on loan to farmers. Demand for stud animals remained firm and all suitable animals were sold without difficulty.

Two Jersey bulls, two Friesian bulls and a Friesian cow, purchased by the Stud Stock Buying Delegation in 1955, are now located at the College. An imported Friesian cow, "Okains Royal Comet"; produced 17,047 lb. milk and 471 lb. butterfat in the first seven months of her present lactation. Her highest production on any one day was 128 lb. milk.

The frozen semen imported in June, 1955, was used to artificially inseminate a number of cows in the Friesian herd. A total of ten cows was successfully inseminated, five of which have already calved.

Excessively wet weather and an outbreak of ephemeral fever early in 1956 seriously interfered with operations in the Section.

New bull sheds and yards in construction will facilitate handling of stock.

The Aberdeen Angus herd now totals thirty-six.

Horses.—The Arab stallion "Sala" was recently transferred to Hawkesbury from Wagga Agricultural College. Two Arabs shown at the 1956 Sydney Royal Show. Their results were one Reserve championship, one first and one third prize. Six Arab foals were born, four males and two females. The Arab stallion "Olympus" was sold for £250.

Two foals were born to stud clydesdale mares.

Research Agronomy.—Many trials were destroyed by floods and the wet weather delayed the planting of autumn sown trials. Uniform yield nurseries of oats and barley for grazing and hay were grown. Variety, fertiliser, and spacing trials were continued with maize, as well as variety and spacing trials with sweet sorghum. These trials were destroyed by floods before yield figures could be obtained. Pure seed production of leaming maize and saecaline were continued. Sweet sorghum selection work was maintained.

Vegetable improvement work has been intensified. It comprised variety and fertiliser trials, testing of numerous introductions, and breeding work with beans, tomatoes and peas.

Most of the established pasture trials were affected by floods. The majority of those trials now in progress were sown only recently and it is too soon for inferences. Because of the increasing importance of irrigation in the district, the number of trials sown for irrigation has been increased. Trials sown include those dealing with species, fertiliser, nodulation, and establishment and management. Most of them are on district properties.

The pasture species observation nursery has been redesigned, and several small seed increase areas of promising strains were sown.

Plant nutrition research progressed satisfactorily, greatly facilitated by the completion of two new glasshouses. The principal responses in the routine testing of soils from various parts of the State have been to phosphorus, sulphur and molybdenum.

A weeds research officer has been appointed. Trials on weed control in vegetable crops have commenced.

WAGGA AGRICULTURAL COLLEGE AND EXPERIMENT STATION.

Student Enrolment.—Accommodation increased and, with it, the student intake. However, demand for enrolment is increasing faster than accommodation. At June it was not possible to accept further enrolments for earlier than 1963.

A new peak, of 74 students, was reached in the first session of 1956. Comparisons at mid-year are tabulated:—

	Enrolled Students.		
	At 1-7-54.	At 1-7-55.	At 1-7-56.
Third Year	15	18	21
Second Year	16	22	22
First Year	26	23	31
Totals	57	63	74

Two pleasing qualitative features are noted in the increased enrolment:—

- The proportion of assisted students, "bursars", "scholars", or "cadets", some of whom were subjected to rigid and competitive pre-selection, has increased from 14 (22.2 per cent.) in 1955 to 21 (28.4 per cent.) in 1956.
- The secondary education level on admission has risen as shown:—

	1955.	1956.
	Per cent.	Per cent.
Admitted with minimum entrance qualifications ...	51	39
Admitted with at least 1 extra year's secondary schooling	1.5	5
Admitted with at least 2 extra year's secondary schooling	47.5	56

Diploma Examinations.—The 18 students in Third Year successfully completed the Agriculture Diploma Course at the 1955 final examinations, two graduating with Honours Class II.

Ex-Students Statistics.—At June 30, 1956, there were 134 ex-students, of whom 93 had gained Diplomas, including 12 with Honours. The remaining 41 left before the end of their second year at the College.

Of the 134 ex-students, 67 are actively engaged in farm work, 23 are departmental officers, 22 are employed by commercial firms with agricultural interests, 10 have left agriculture, 2 are undergoing further training and the occupations of 10 are unknown. Thus, at least 84 per cent. of the ex-students are following agriculture!

Student Tours.—Three regular tours, to the southern tablelands and Illawarra districts for 5 days in October, to Batlow for 4 days in November, 1955, and to the M.I.A. for 5 days in May, 1956, were undertaken by senior students.

Various half- or one-day tours were conducted to prominent local sheep and cattle studs, the Wagga Soil Conservation Research Station and local saleyards, abattoir, flour mill, and dairy factory.

Students also visited for educational purposes the Sydney Royal Show, the M.P.A.A. Show in Wagga, and the Wagga Ram Show and Sales, gaining experience thereat as stock attendants and in stock- and produce-judging competitions.

Extra-curricula Activities.—Students regularly engaged in competition with other bodies in Rugby Union football, athletics, swimming, rifle shooting, tennis and basketball. Intra-mural contests were held in athletics, swimming and basketball. The notable sporting achievement of 1955 was the winning of the Byrnes Cup for First Grade Rugby Union competition in Wagga. In 1956 two College students were selected to play Rugby Union for New South Wales.

Teams again competed in the Australian Agricultural Colleges' Sports Association's rifle shooting and tennis contests held in 1955 at Gatton College, Queensland.

Intra-mural debating was given a fillip with the award of a trophy by David Jones (Wagga Wagga) Pty. Ltd.

The First Aid class received tuition again from members of the Wagga Wagga Ambulance Station staff and all candidates were successful in obtaining the St. John's Ambulance Certificate.

Officers of the Bank Education Service visited the College to deliver lectures on banking facilities.

Official Functions, Schools, Conferences, Field Days, Visitors, etc.—The Poll Shorthorn Beef Cattle stud was officially opened by the Hon. E. H. Graham, M.L.A., Minister for Agriculture and Food Production in October, 1955. An official Banquet and Presentation of Sports Prizes was held in December, 1955. The College in association with the Wagga Agricultural Research Institute provided facilities for a field day for the N.S.W. Farmers and Settlers' Association Southern Zone Convention (attendance 120) in March, 1956. The attendance for each of those three occasions exceeded 100 persons.

The Hon. E. H. Graham, M.L.A., presented the Diplomas and prizes at the fifth Annual Diploma Day on 13th April, 1956. Attendance exceeded 400.

The sixth Junior Farmers' School in wheat and sheep husbandry commenced on 25th June, 1956, with an attendance of 25 in residence. The fourth Turkey Raisers' School and Conference, the most successful so far, in July, 1955, had an average daily attendance of 50.

"Group visits" were made to the College respectively by 15 Junior Farmers from the M.I.A. in November, 1955; 20 visitors from the Wheat, Flour, and Bread Convention held in Wagga in November, 1955; 40 Junior Farmers from the north coast in January, 1956; and 20 Great Public School boys in May, 1956.

The Chief, Division of Information and Extension Services, with two members of his staff conducted the seventh annual Extension Methods/Leadership School (5 days) for students of the College in September, 1955.

The College gave in-service experience to a number of University trainees, also to several overseas visitors under the Colombo Plan, for periods ranging from one to a few weeks in accordance with the case concerned.

The number of visits from prominent officials of other Departments (Commonwealth and intra-state), Departments of Agriculture (interstate and overseas), interested tractor and machinery firms, and commercial enterprises closely linked with agriculture, markedly increased. This was partly because of the increasing tempo of research activities at the adjacent Agricultural Research Institute and partly because the College itself is now more widely known.

The College provided facilities for regular quarterly meetings of the Southern Region Advisory Committee. It again held an "Open Day" in Education Week in August, 1955; but this was again poorly patronised, presumably because the "local-parent" factor is non-operative. The majority of the students are from distant parts of the State.

College officers acted as stewards and judges at local country shows and assisted in other ways the extension and, in some cases, regulatory functions of the Department.

Library Service.—Approximately £100 worth of books was added to the College Library, and the Wagga Wagga City Council by special concession has made Wagga's free library service available to the College students.

Works and Improvements.—Excellent progress has been made on the E. H. Graham Block, and other new buildings, and in the alterations to existing buildings. The stewards' block, sixteen bedrooms, was completed and occupied in April, 1956. The officers' block is nearing completion. Tenders have been called for the construction of treatment works and sewers to service the foregoing blocks and all adjacent cottages and buildings. Nine new cottages and a temporary officers' block were completed; and most of them were occupied early in the year.

The fourth of four Nissen huts, a petrol bowser, one oil storage shed, a 500-gallon overhead storage tank for diesel fuel and 4 x 1,500 bushel grain silos were erected on appropriate permanent sites with College labour. New bull yards and sheds at the Dairy Section are nearing completion. A footbath was built at the shearing shed and a new section and tool store were added to the mechanic's shop.

The College drive was gravelled and formed in preparation for sealing but lack of funds made the latter operation impossible. Work on the College oval has been at a standstill for ten months due to default on the part of a contractor. A second contractor engaged to finish the work has been prevented by weather from so doing. A considerable amount of building repairs was effected until lack of funds dictated retrenchment of casual labour so employed.

Five residents' cottages were sewerer, with the completion of work on a septic tank.

Sectional Operations at Wagga.

College Farm.—The 1955 cereal acreage and production are tabulated:—

	Acres Sown.	Bushel Grain.	Tons.
Wheat—Hay	32	...	29
Wheat—Feed Grain	159	3,490	...
Wheat—Seed	95	1,600	...
Oats—Hay	15	...	20
Oats—Feed Grain	71	2,007	...
Oats—Seed	29	690	...
Oats—Green Feed and Silage...	37	...	80
Barley—Feed Grain	2	30	...
Barley—Seed	6	211	...

A feature of cereal results was the production of 1,200 bushels of Javelin 48 seed wheat for Departmental distribution to Registered seed growers and other wheat farmers.

In 1956, some 396 acres were sown to cereals and 417 acres of land were followed.

Additional sown pasture of 45 acres brought the total sown pasture to 1,063 acres. Additional sown lucerne of 40 acres brought the total lucerne area to 178 acres. Six hundred and eighty-six acres of pasture and 134 acres of lucerne were top-dressed. Forty acres lucerne were sprayed with D.D.T. for control of red legged earth mite. Hay was produced as follows: Pastures 4,682 bales; Lucerne 3,802 bales.

Routine weed control was employed on 28 acres of cereal crops, sprayed with 2.4D for control of skeleton weed, and 15 acres of pasture, sprayed with 2.4D for control of thistles.

Tree-planting included 200 peppercorns and olives, at the Beef Cattle Section and fifty kurrajongs in the College farm building area; whilst approximately 10 acres were contour-furrowed in preparation for tree plantings.

A well was dug and a windmill erected, to supply water to 311 acres in paddocks Nos. 10 and 10A.

Filtered water reticulation was extended.

A further area, 40 acres, was cleared for cropping; 10 acres in paddock No. 9B and 30 acres in paddock No. 10.

Eighty-five chains of new subdivision fences and 20 chains of boundary fences were erected. Other farm fencing repairs and the replacement of old gates by 18 feet wide iron gates were carried out. The nine new cottages were also fenced in.

Major plant purchased included a lathe and woolpress. A Harvey stubble mulcher and an A.S.L. irrigation plant were donated. A McKay combine, a "Jayhawk" sweep rake, a Fordson scarifier and electric welder were the main items of new loan equipment. An AWD6 tractor (International Harvester Company); a 745-D tractor (H. V. McKay Massey Harris Pty. Ltd.); an I.H.C. combine, mower, rake and baler, and a McKay header were replaced by these two firms with the latest models.

Dairy Section.—The herd number averaged 110, with an average of thirty-two in milk. Production for 1955-56 was 340 lb. of butterfat per cow, an increase of 65 lb. per head from the previous year. This production increase was due to a good season, improved standard of feeding, heavy culling, and control of mastitis.

Fourteen stud bulls were sold at an average of 34 guineas, and twenty-one surplus cows and heifers were sold at an average price of 22 guineas.

The bull "The Mount's Orange Boy" (imp. Jersey Island) was introduced to the herd during April, 1956. Eight heifers were received from Yanco Experiment Farm, completing the transfer of stock.

Show teams were exhibited at the Sydney Royal Show and the M.P.A.A. Show, Wagga, with limited success at the Royal and major honours at the local Show.

Piggery Section.—The three breeds of pigs on the Section have been retained, Berkshire, Tamworth and Large White. The number of pigs maintained averaged 155. A Tamworth boar was received from Wollongbar Experiment Farm and a Large White boar from Hawkesbury Agricultural College, as replacements for culled boars.

A total of fifty-four stud pigs were sold to farmers in New South Wales, consisting of twenty-eight boars and twenty-six sows. One boar was exported to Fiji. The total value of stud stock sold was £1,036 2s. 6d. Fresh pork requirements by the College kitchen absorbed 150 pigs; thirty-nine pigs were consigned to the local bacon factory for College use as bacon. Two aged boars and six backfatter sows were sold at the local saleyards. Four baconers and two porkers were sold by auction at the Sydney Royal Show.

The College Show teams received one First and Reserve Championship at the Sydney Royal Show, four Championships at the Wagga Show, and a First in the New South Wales Bacon Competition.

Because of the sharp fall in the price of commercial pigs, the demand for stud pigs for the first eight months of the year was very poor. Since the increase in commercial prices the demand for stud pigs has exceeded the supply.

Horse Section.—The Arab stud at June, 1956, consisted of 3 entires, 12 brood mares, 9 young mares, 9 foals (fillies 7, colts 2). The important addition was the stallion, Razaz (imp.), a six-year-old which arrived in January, 1956. The outstanding brood mare Sir Aatika died in November, 1955. In 1956, the stud sire Sala was transferred to Hawkesbury Agricultural College. Three colts were sold for £210 each and a filly for £157 10s.

The Arab stud team at the 1956 Sydney Royal Show met with conspicuous success:—

Stallion—Razaz, 1st and Champion.

Colt—Prometheus, 1st.

Mare—Juno, 1st and Champion.

Filly—Callisto, 1st; Hestia, 2nd.

Beef Cattle Section.—The Poll Shorthorn Stud was officially opened in October, 1955. The Section, as a unit, is a "show-piece" of the College and has attracted considerable attention and favourable comment from visitors.

Natural increase and importation have built the Stud up from 26 head in June, 1955, to 41 in June, 1956, comprised of 35 cows and heifers, 3 bull calves and 3 bulls. A team of imported stock arrived in June, 1956, including the bulls Birmingham Nuggett 3rd (imp. Canada); R. B. Collynde Supreme (imp. U.S.A.); and 5 cows and 1 bull calf. Some of the younger stock are showing excellent promise. Weekly growth rates of all young animals continue to be recorded.

At the 1956 Sydney Royal Show the College exhibited, for the first time, a very small team which included the Supreme Champion of the breed and a steer, placed second, which obtained the highest price for the breed at the sales on the Showground.

Sheep Section.—**Dorset Horn Stud.**—The hand service commenced on 1st November, 1955, when 220 ewes were joined with 5 stud rams. The subsequent lambing progressed well, with 190 lambs born. Little trouble was experienced at lambing.

Fifty ewes were culled from the stud after classing. Flock ram demands by other Departmental Farms were met and twenty-nine others sold at Wagga Wagga Ram Sales. The demand for both rams and ewes could not be met in full.

Some crossbred lambs were again bred for student instruction. A pen of fat lambs was entered in the Riverina Fat Lamb carcase competition. Ration sheep were supplied to the quarters.

Poultry Section.—The fowls are Australorps and White Leghorns, with a few Rhode Island Reds and New Hampshires. The turkeys are White Holland and American Bronzewing. At 30th June, 1956, the flocks comprised 685 fowls and 261 turkeys.

Pullorum testing continued, with decreasing numbers of reactors. The consequent constant handling, the very wet conditions, the absence of deep litter, and an outbreak of fowl pox, combined to give the lowest egg production ever recorded at the College.

Trapnesting of all turkey breeding stock was possible for the first time. The results were very variable, but White Holland egg production averaged 52 (range 31-53) and American Bronzewing production average 43 (range 16-67).

From the previous year's records it was possible to ascertain the maturity rate of turkey females, i.e., age to first egg, as: White Holland—271 days (range 216-320), and American Bronzewing—291 days (range 236-315). This was the first work of the kind in Australia with turkeys.

Growth rates and hatchability of turkeys have been particularly disappointing, compared with American results, but work has yet to be done on feed efficiency.

Labour saving drinking nipples on some of the laying sheds and automatic waterers in the turkey breeding pens have been installed. White Cedar trees have been planted to provide more shade, and an avenue of poplars has been planted to improve the approach of the Section. Greenfeed supplies have been ensured by the planting and preparation of further plots of lucerne.

Apiary Section.—Throughout the year conditions were extremely unfavourable for honey production and general bee-keeping. The 1955-56 production was the lowest for many years.

Thirty-five hives were maintained in reasonable to good condition. Complete re-queening was carried out in August and September, 1955, but the lack of new breeding stock rendered this partly ineffectual. Swarming was heavy during September and early October, 1955, but the swarms re-combined and, with the elimination of a number of weak hives, there was no increase in the apiary numbers.

Orchard Section.—The abnormal rains benefited the trees directly and the orchard covercrop. Generally the crops were fair to good and quality fair.

About 30 per cent. of the prune crop was lost by bird action, and a further 15 per cent. by almost impossible drying conditions during the main part of the usual drying month. Hawkesbury College is using about 18 cwt. for processing. Pears were lighter than last year and the storage quality was poor. The apple crop was the heaviest for some time, but the cull was heavy due to weather spoilage. Some pulping was done. More will be canned. The almond crop was good, although harvesting was very difficult because of the weather. The olive crop was the best for some years. Oil olives were small, but some of the pickling types were very large and turned out a good article.

The orchard road was reformed, and contour furrows were connected to the body of the orchard land, from the Cannery down hill. From the Cannery west has yet to be done.

The contour furrowing was extended and, together with existing large contour banks and terraces graded last year and planted up this year, provide now three methods of water and erosion control in the orchard.

There are now sufficient good trees for student budding practice, because of trees developed in the new nursery under spray irrigation. More trees have been planted to give continuity to pruning instruction for students, in tree formation from nursery to maturity.

A plum-stock trial designed to eliminate all the weaker stock now used by the Division of Horticulture has been added to the College orchard.

AGRICULTURAL RESEARCH INSTITUTE, WAGGA WAGGA.

Early difficulties in recruiting staff for the newly established Institute have been largely overcome and all initial work programmes have now been commenced.

Wheat Improvement.

Field Testing.—Climatic conditions during the 1955 season favoured high yields at the three major testing centres, Wagga Wagga, Temora and Condobolin. The yields of the better crossbred wheats exceeded 40 bushels per acre at these centres and also at the subsidiary testing stations, Quandialla and Moomboldool.

Disappointing yields were secured in the new trials at Wallendbeen, indicating that greater attention must be directed to the problems associated with wheat varieties for the highly improved soils of this region.

Major factors contributing to yield differences were stem rust and *Septoria tritici* at Wagga Wagga and Temora, while stem rust considerably reduced yields of susceptible material at Condobolin and Wallendbeen.

Javelin 48 vs. Bencubbin.—Despite the susceptibility of Javelin 48 to *Septoria tritici*, this variety performed well in comparison with Bencubbin and is now recommended for sowing as an alternative to Bencubbin. Quality tests have confirmed its superiority over Bencubbin.

Superior Crossbreds.—Several crossbreds outyielded standard varieties at all centres and, since they possess improved quality and disease resistant characteristics, steps are being taken to multiply seed stocks in readiness for subsequent naming and release.

Back-crossing to Improve Bencubbin Quality.—A back-crossing programme for the improvement of the baking quality of Bencubbin has been carried through a further stage and at least partial success now seems probable. At present the Pelshenke test is used as the selective agent but it is hoped that other, supplementary tests will soon become available.

"Rod-row" Technique for Yield Analysis.—An examination of the effectiveness of the "rod-row" technique in yield analysis has been made. The general experience has been that the results from such trials closely parallel those from 1/40th acre trials. The coefficient of variability for the rod-row trials was, however, higher than 1/40th acre trials.

Wheat Disease Studies.

Root-rot Studies.—Investigations of the ability of cereal root rot fungi to survive in wheat straw incorporated in soils of high and low nitrogen status have been continued. Data for survival periods up to fifty weeks indicate that survival of the fungi causing take-all and fusarium or pink root rot is promoted under conditions of high soil nitrogen; survival of the common root rot is markedly depressed.

Observations indicate that field incidence of take-all and *Fusarium* root rot tend to increase under conditions of improved soil fertility. The observations recorded in the preceding paragraph suggest that this is due to enhanced survival of their causal agents in soils of high nitrogen content. On the assumption that incorporation of plant residues will effect a temporary reduction in available nitrogen content, of high fertility soils, thereby leading to a more rapid decline in survival of the fungi responsible for take-all and fusarium root rot, the effect of adding various types of stubble material, on soil nitrogen content and fungal survival in these "amended" soils, will now be investigated.

The ability of cereal root rot fungi to carry-over in the soil in a free-living state, as distinct from survival in crop residues, is under investigation; so too is their ability to colonize disease-free stubble in soil containing infected crop remains.

The identification of *Fusarium* species affecting wheat is proceeding—at least three different species appear to be involved.

Genetic Studies of Rust Resistance.—These were continued, and widespread occurrence of the "Eureka" gene for resistance has been demonstrated in several Australian and overseas varieties of wheat.

A valuable source of stem-rust resistance has been detected in an Agropyron-wheat derivative, and steps are being taken to add this resistance to that already obtained.

Septoria tritici, Breeding for Resistance.—The development of satisfactory techniques for producing uniform infection with *Septoria tritici* has placed breeding for resistance to this disease on a sound basis.

Wheat Quality Investigations.

As a result of delay in the delivery of test-baking equipment, the routine quality testing of the samples from experimental plots and the district survey did not begin until late in April, 1956.

Quality Testing.—Comparative evaluation tests are being made using the Alveograph, test-baking, protein and gluten determinations, and the Zeleny sedimentation test. Special attention is being given to the Zeleny test, in the expectation that it will prove useful as an early quality guide for the wheat breeder.

District Survey re Bencubbin Grain Quality.—A district survey was made, to assess the relation of soil factors to grain quality of the widely grown Bencubbin variety. Although the baking quality of this variety is generally regarded as very poor, the present work has shown that its quality is largely dependent on the fertility status of the soil.

Distinct improvement is evident when Bencubbin samples from soils of high fertility are tested. In general, on soils giving good quality grain a rank straw growth, considerable lodging, and high contents of grain protein, are characteristic.

Oat Improvement.

The crossbred F.F.G. Markton referred to in the 1954-55 report has been released to farmers as Fulmark. Fulmark, Avon, and Dale gave superior yields in ungrazed trials.

Factors associated with recovery after grazing were further investigated. It appears that tillering capacity is the most useful guide for selection of superior grazing crossbreds. Yates Algerian was the outstanding variety in grazing trials, proving superior to the standard recommended varieties.

Pasture Investigations.

Subterranean Clover Strains, Regional Assessment Trials.—Strains selected from a comprehensive collection of Australian and Mediterranean types are in the regional assessment trials. Special attention is being given to growth rhythm, particularly in the early maturing strains which may prove superior to those now being grown in drier areas of the Southern Region of New South Wales.

Pasture and Weed Seed Population Study.—A study of the pasture and weed seed populations in pastures of various ages has been commenced.

Virus Diseases of Subterranean Clover.—During the winter of 1955 attention was drawn to a disease affecting subterranean clover over a large area of south-eastern Australia. It was investigated in collaboration with the C.S.I.R.O. and shown to be caused by an aphid transmitted virus. Work on other aspects of this problem, especially the possibility of seed transmission of the disease, is still in progress.

A second virus disease appeared in a newly accessioned strain. Tests have shown that this virus may be transmitted through the seed.

Weed Investigations.

Low Volume Spraying of Skeleton Weed.—Experiments with newly developed hormone-like selective weed killers gave variable degrees of skeleton weed control. However, effective control by phenoxy-butyric acid derivatives was accompanied by better germination of subterranean clover as compared with the standard phenoxy-acetic acid derivatives.

Soil Fertility Studies.

Initially, the soil studies are directed to problems of phosphorus, nitrogen and molybdenum nutrition of crop and herbage plants in the Southern Region.

Nitrogen Status of Soils.—Assessment of nitrogen status of soils by chemical techniques is being investigated. Total nitrogen level has proved of limited value as an indicator of protein values expected in wheat grain from soils of the Southern Region. Easily hydrolysable nitrogen correlates better with grain protein levels.

A start has been made on fractionating the soil organic nitrogen with a view to following the changes when plant residues are incorporated in the soil. Some major differences between Australian and English soils in the composition of the organic nitrogen have already been found.

Phosphate Solubility and Availability.—Work has commenced on factors affecting phosphate solubility and availability in the soils of the Region. Field trials have been established on

six sites on the Wagga Agricultural College and Experiment Station to provide a Mitscherlich type response curve to added phosphate. Similar trials are planned for other sites throughout the surrounding district next year.

The results of these trials and of phosphate solubility studies on the soils are expected to provide in due course the basis for a soil analysis method that can be adopted by other sections of the Department for a routine advisory service to the farmers of the district.

Later work will be concerned with factors responsible for loss of availability of phosphate fertilizers in the soils of the Region. Preliminary inquiries amongst farmers suggest that residual phosphates are largely in a form unavailable to plants.

Molybdenum Studies.—A number of soils have been analysed for total and available molybdenum, by methods developed in New Zealand. It appears that some areas in the wheat belt are sufficiently low in molybdenum to suggest that responses to added molybdenum may occur in legumes.

Yours faithfully,

R. J. NOBLE,

Under Secretary and Director.

10th September, 1956.

APPENDICES :

I. The Accounts.

II. Published Matter.

APPENDIX I.

The Accounts of the Department of Agriculture, 1955-56.

There was an increase in expenditure from Consolidated Revenue Fund and a reduction in expenditure from General Loan Account during the financial year.

COMPARATIVE STATEMENT OF EXPENDITURE.

Account.	1954-55.	1955-56.	Increase or Decrease.
	£ s. d.	£ s. d.	£ s. d.
Consolidated Revenue Fund	2,975,303 12 6	3,184,275 18 10	208,972 6 4 (Increase.)
General Loan Account	167,626 1 11	149,999 0 8	17,627 1 3 (Decrease.)
Totals	3,142,929 14 5	3,334,274 19 6	191,345 5 1 (Increase.)

EXPENDITURE FROM GENERAL LOAN ACCOUNT.

The Loan expenditure for the year was £149,999 0s. 8d., of which £43,033 9s. 10d. was spent at Hawkesbury Agricultural College; £92,118 7s. 2d. at Wagga Agricultural College and Experiment Station; £11,088 16s. 9d. at Experiment Farms and Nurseries; £169 18s. at the Botanic Gardens; £70 2s. 7d. at Glenfield Veterinary Research Station; and £3,518 6s. 4d. on Public Watering Places in the Western Division of the State. An amount of £2,187 13s. 8d. was received from Pastures Protection Boards for instalments on rabbit destruction equipment supplied to them, the cost of which was met from General Loan Account.

SPECIAL DEPOSITS ACCOUNT.

Swine Compensation Fund.

In terms of the Swine Compensation Act, 1928-1934, this Fund was established for the payment of compensation to owners of pigs destroyed and carcasses condemned in accordance with the provisions of the Act. The account is credited with moneys collected by the Commissioner of Stamp Duties in respect of swine duty, originally fixed at 1s. per head, reduced to 9d. per head from 1st March, 1935, and increased to 1s. 3d. per head on 1st October, 1945, and to 2s. per head from 1st May, 1948, on all pigs delivered for slaughter to an abattoir. Fines paid for breaches under the Swine Compensation Act, 1928-1935, are also credited to the Fund.

In the case of a pig ordered to be destroyed because it is suffering from or suspected of suffering from disease, the compensation is fixed by the Act at the full market value of the pig, less its residual value if on destruction it is found to be free from disease; and seven-eighths of the market value of the pig, less the residual value, if it is found to be diseased on destruction.

In regard to the compensation payable in respect of a condemned carcass, under the original regulations the amount of compensation was the full market value of the animal prior to slaughter, less the residual value in respect of condemned forequarters; and two-thirds of such market value, less residual value, in respect of condemned hindquarters. Under an amendment to this regulation made on 12th March, 1937, the amount of compensation for a condemned carcass was reduced to three-quarters of the market value of the pig immediately prior to slaughter, to one-quarter of such market value in the case of a condemned forequarter and to one-half the market value in respect of a condemned hindquarter. The market value of any pig is not to be deemed for the purpose of the Act to exceed (a) if a pig is a stud pig, £20; and (b) if the pig is not a stud pig, £10. For the purposes of the regulation "stud" pig means a pig registered by the Australian Stud Pig Breeders' Society.

Prior to 31st December, 1937, compensation was payable in the case of various diseases, including Tuberculosis, Swine Fever and Anthrax. By proclamation which came into operation on 31st December, 1937, all diseases, apart from the three specifically mentioned, were excluded from the provisions of the Act. By proclamation, Brucellosis was added to these diseases in January, 1941, and Septicaemia on 15th January, 1943.

The operations on the Swine Compensation Fund for 1955-56 are summarised hereunder:—

	£ s. d.	£ s. d.
Balance at 1st July, 1955 ...		23,228 5 1
Receipts—Stamp Duty		57,255 10 10
		£80,483 15 11
Disbursements—		
Swine Compensation ...	36,816 18 1	
Commission on Duty		
Stamps	175 18 4	
Reduction of Advance		
made by Treasury ...	9,000 0 0	
		45,992 16 5
Balance as at 30th June, 1956		£34,490 19 6

The amount advanced by the Treasury to the Fund has now been repaid.

Fund Created by the Wheat Marketing (Barring of Claims) Act, No. 22 of 1929 (as amended by Act No. 38 of 1930).

In terms of the Wheat Marketing (Barring of Claims) Act, 1929, all claims against the Government in respect of old wheat pools were barred. The State Wheat Office was closed and the funds in the hands of the State Wheat Board were paid to the Treasury. After payments of expenses incurred in financial operations, such funds were to be applied in making certain payments to the University of Sydney and to specified trustees for purposes incidental to and in connection with research work, and the balance of the moneys invested by the Colonial Treasurer in Government stock, the interest therefrom to be spent on agricultural education or research as the Minister for Agriculture may direct. Any interest unexpended at the end of the year is to be capitalised.

An amount of £5 2s. 7d. was received from the trustees appointed by the Governments of New South Wales, Victoria, South Australia, Western Australia and the Commonwealth to deal with the assets of the Australian Wheat Board in connection with the 1914-18 war.

The only asset remaining is a debt by the Roumanian Government covered by bonds of £114,600, of which this State's share is £24,620 (less £1,108 principal repaid) approximately. There has been no payment on the bonds since 1931 and the trustees report that the prospect of any future payment seems to be negligible.

At 30th June, 1956, the Fund had assets amounting to £38,125 9s. 10d., comprising Australian Consolidated Inscribed Stock £36,860; cash in Bank £958 11s. 7d.; and accrued interest £306 18s. 3d. These figures are exclusive of assets in course of realisation.

No payments were made from the Fund during the year, but an amount of £1,232 3s. 10d. was set aside to meet outstanding commitments.

The Revenue Account and Balance-sheet of the Fund for the year ended 30th June, 1956, are shown hereunder:—

REVENUE ACCOUNT FOR THE YEAR ENDED 30TH JUNE, 1956.

	£	s. d.		£	s. d.
To Commitments	1,232	3 10	By Interest on Investments (Government Securities)	1,201	10 8
			Transfer from State Wheat Pools Account ...	5	2 7
			Bank Interest	25	10 7
	£1,232	3 10		£1,232	3 10

BALANCE SHEET AS AT 30TH JUNE, 1956.

LIABILITIES.			ASSETS.		
	£	s. d.		£	s. d.
Accumulated Funds as at 1st July, 1955	35,733	15 9	Investments in Government Securities (Face Value)	36,860	0 0
Add—			Balance at Commonwealth Savings Bank	958	11 7
Unexpended balance of Commitments at 30th June, 1955, transferred to Accumulated Funds	1,159	10 3	Interest accrued at 30th June, 1956	306	18 3
Accumulated Funds 30th June, 1956	36,893	6 0			
Commitments to 30th June, 1956	1,232	3 10			
	£38,125	9 10		£38,125	9 10

Western Division Public Watering Places Fund.

The controlling authorities of Public Watering Places in the Western Division of the State are required by section 78 (3) of the Pastures Protection Act, No. 35 of 1934, to pay to the Minister not later than 31st January in each year all moneys in their Public Watering Places funds in excess of the sum of £100. The moneys so paid to the Minister are credited to a Special Deposits Account at the Treasury called the "Western Division Public Watering Places Fund". The moneys so credited are used in the construction or maintenance of tanks, dams and other structures, machinery or works for storing or providing water or otherwise improving Public Watering Places in the Western Division.

The operations on the account during 1955-56 are shown hereunder:—

Balance as at 1st July, 1955—Nil.
 Receipts—£2,110 14s. 5d.
 Payments—£2,110 14s. 5d.
 Balance at 30th June, 1956—Nil.

Noxious Insects Destruction Account.

Section 10 (1) of the Noxious Insects Act, No. 22 of 1934, provides that such Pastures Protection Boards as are from time to time specified by proclamation published in the *Gazette* shall in each year make and levy a special rate in the amount prescribed in respect of such year on each owner or occupier of ratable land within the district in respect of large stock and sheep for which he is liable to pay rates under Part II of the Pastures Protection Act, 1912, or under any Act amending or replacing same.

Section 10 (1) of the Act was amended during 1954 by increasing the amount of the special rate which may be levied from 1d. to 3d. per head in the case of large stock and from one-sixth of a penny to one half-penny in the case of sheep.

The amount received in respect of rates so levied are paid by the Boards to the Minister as a contribution to the cost of suppression and destruction of noxious insects.

All contributions received by the Minister are paid into an account in Special Deposits Account at the Treasury called the "Noxious Insects Destruction Account". Moneys

at the credit of such account are applied by the Minister to the purchase of materials for the purposes of the Act and to repay to the Colonial Treasurer any moneys advanced by him.

Receipts and payments for each year since the passing of the Act in 1934 are shown hereunder:—

Financial Year.	Receipts from Pastures Protection Board.		Payments.	
	£	s. d.	£	s. d.
1934-35.....	925	14 10	10,274	8 8
1935-36.....	1,712	1 0	731	10 10
1936-37.....	7,941	2 4	2	4 7
1937-38.....	8,707	11 11	42,161	1 11
1938-39.....	27,495	5 3	8,244	8 10
1939-40.....	17,032	2 6	5,676	16 4
1940-41.....	7,936	12 5	1,858	5 11
1941-42.....	1,169	6 3	94	16 0
1942-43.....	772	4 0	641	10 8
1943-44.....	221	1 6	1,323	16 0
1944-45.....	393	15 4	250	5 5
1945-46.....	40	17 1	48	16 8
1946-47.....	524	16 2	4,823	2 10
1947-48.....	1,913	0 6	5,534	18 6
1948-49.....	11,099	15 2	3,197	6 9
1949-50.....	664	16 3	616	13 9
1950-51.....	924	11 0	1,564	4 9
1951-52.....	46	11 5	128	16 0
1952-53.....	1	0 0	85	14 5
1953-54.....	4,041	1 0	128,949	2 7
1954-55.....	51,588	0 3	176,497	14 8
1955-56.....	161,994	2 3	52,976	1 4
	307,509	1 5	445,681	17 5
Grant by Treasury	75,000	0 0	.....	.....
Add advance by Treasury	75,000	0 0	.....	.....
Less Sales of Materials	.....	.....	1,867	1 10
			443,814	15 7
Balance in Special Deposits Account at 30th June, 1956 .....	.....	.....	13,694	5 10
£	457,509	1 5	457,509	1 5

The following is a summary of transactions on the Noxious Insects Destruction Account for the financial year 1955-56:—

RECEIPTS.			PAYMENTS.		
	£	s. d.		£	s. d.
Balance as at 1st July, 1955	13,066	4 4	Poison materials	38,538	3 7
Levies from Pastures Protection Boards	161,994	2 3	Spraying (including air spraying)	6,229	15 5
Sales of Materials.....	1,610	0 7	Salaries and Wages	2,928	14 4
			Equipment Purchases	1,257	15 11
			Equipment Repairs	271	19 10
			Freight and Cartage	1,057	0 10
			Travelling expenses	993	19 11
			Hirings and rental	854	17 1
			Maintenance of Motor vehicles	497	5 5
			Advertising	119	4 6
			Erection of Shed	96	12 0
			Commission	65	0 0
			Postal and Telephonic Costs	53	16 10
			Printing and Stationery	8	11 9
			Pay Roll Tax for 1954-55.....	3	3 11
				52,976	1 4
			Reduction of Advance	110,000	0 0
				162,976	1 4
			Balance at 30th June, 1956	13,694	5 10
				£176,670	7 2
				£176,670	7 2

Pastures Protection Boards of New South Wales—Subsidy to Glenfield Veterinary Research Station.

The Council of Advice of the Pastures Protection Boards of New South Wales agreed in 1934 to meet the salaries and travelling expenses of two research officers in veterinary science to be attached to the Glenfield Veterinary Research Station and to defray the cost of such materials and experimental animals as may be agreed upon. The subjects of major research

on which officers are to be engaged are decided upon by the Council on the recommendation of a committee consisting of the Chief, Division of Animal Industry, and the Director of Veterinary Research.

The following is a summary of transactions on the account for the financial year 1955-1956:—

RECEIPTS.			PAYMENTS.		
	£	s. d.		£	s. d.
Balance at 1st July, 1955	92	5 6	Salaries	802	3 11
Contributions from Council of Advice to Pastures Protection Boards	1,600	0 0	Travelling Expenses	5	6 10
			Payroll Tax for 1954-55	36	10 6
			Workers' Compensation Insurance Premiums ...	29	15 10
				873	17 1
			Balance at 30th June, 1956	818	8 5
				£1,692	5 6
				£1,692	5 6

Veterinary Surgeons Act, No. 25 of 1923.

The Act provides for the establishment of a Board to be called "Board of Veterinary Surgeons of New South Wales". Fees and penalties collected under the Act are paid to the credit of Consolidated Revenue Fund, from which adminis-

trative expenses are met. At 30th June, 1956, there were 381 registered Veterinary Surgeons.

The Statement of Receipts and Payments for the financial year 1955-56 is shown hereunder:—

RECEIPTS.			PAYMENTS.		
	£	s. d.		£	s. d.
Registration Fees	28	7 0	Salaries	459	14 7
Restoration Fees	16	16 0	Board Fees	91	7 0
Roll Fees	769	13 7	Travelling Expenses of Members	18	2 10
Examination Fees	81	18 0	Postage	20	16 7
			Printing	25	5 0
			Examination of Foreign Graduates—		
			Examination Fees	63	0 0
			Travelling Expenses.....	21	7 0
				84	7 0
			Sundry Charges	1	14 0
				£701	7 0
			Excess of receipts over payments	195	7 7
				£896	14 7
				£896	14 7

Contribution by Milk Board towards Cost of Herd Testing.

In 1937, the Chief Veterinary Surgeon of the Department was appointed as Consulting Veterinarian to the Milk Board to supervise and control the testing of cows for tuberculosis and matters associated therewith. The Milk Board agreed to provide up to £1,250 per annum from 1st July, 1937, to meet the cost of the services to be performed by the Department. This contribution was varied from time to time in accordance with the rise and fall in the actual expenditure. From the

financial year 1952-53 the Board agreed to meet the actual cost of T.B. testing of herds, estimated at £3,315 13s. 10d., which sum was exclusive of the salaries of two office assistants attached to the Department for the carrying out of records and statistical work and whose salaries are paid direct by the Milk Board.

The operations on the account for the financial year 1955-56 are shown hereunder:—

RECEIPTS.			PAYMENTS.		
	£	s. d.		£	s. d.
Contributions by Milk Board	3,910	17 1	Salaries	2,837	19 4
Balance payable by Milk Board at 30th June, 1956...	158	6 1	Employer's Superannuation Contributions	236	4 1
			Workers' Compensation Insurance	60	4 8
			Travelling Expenses.....	818	14 5
			Postal Expenses	7	6 8
			Printing	17	5 8
				3,977	14 10
			Payroll tax	91	8 4
	£4,069	3 2		£4,069	3 2

Potato Growers Licensing Act.

The Potato Growers Licensing Act, 1940-1952, requires all persons who use an area of land exceeding one acre for the production of potatoes to obtain a licence under the Act. Application for licence or for the renewal of a licence shall be accompanied by a fee. The fee is prescribed by section 3 (2) of the Act and was increased from 10s. to £1 as from 1st December, 1952.

The licence fees collected and any penalties imposed under the Act are paid into a special account at the Treasury. The Colonial Treasurer shall upon the recommendation of the Minister for Agriculture, pay out of such special account moneys—

- (a) to any society registered under the Co-operation Act, 1923-1938, or any other association or body of persons

which, to the satisfaction of the Minister, will wholly apply such moneys to the promotion of the production, marketing, treatment and sale of potatoes.

- (b) to be used in any other manner which the Minister deems to be best calculated to develop or protect the potato growing industry.

Any moneys so paid shall be expended for such purposes in furtherance of the interests of the potato growers of New South Wales as in any particular case the Minister may approve, or generally as may be prescribed.

The transactions in the Special Deposits Account for the financial year 1955-56 are as follows:—

RECEIPTS.			PAYMENTS.		
	£	s. d.		£	s. d.
Balance at 1st July, 1955	527	1 1	Grants to Potato Growers' Association	1,450	0 0
Licence Fees	1,516	8 6	Printing	35	19 9
Less refunds	12	0 0	Administration Costs	74	6 0
	1,504	8 6	Postage	69	12 6
	£2,031	9 7	Balance at 30th June, 1956	401	11 4
				2,031	9 7

Grant by McGarvie Smith Institute towards the Running Expenses of the Nutrition Station at Shannon Vale.

A Nutrition Research Station was established in 1938 in the New England district for the purpose of carrying out a series of experiments associated with anaemia in sheep. The estimated working costs were £400 per annum less revenue to be received from the sale of wool. The McGarvie Smith Institute agreed to provide the difference between the amount received from the sale of wool and £400 each year for a term of five years. The first contribution of £200 was received in 1938. In July, 1943, the Institute approved of the continuance of the subsidy for a further period of five years and from

1st January, 1946, the subsidy was increased to £600 per annum, less revenue from the sale of wool. In October, 1948, the Institute agreed that the subsidy would continue for a further period of five years.

Grants received from the Institute and the proceeds from the sale of wool are credited to a Special Deposits Account.

Transactions on the account for the financial year 1955-56 shown hereunder:—

RECEIPTS.			PAYMENTS.		
	£	s. d.		£	s. d.
Balance at 1st July, 1955	3,183	1 5	Wages	1,010	3 3
Sale of Livestock	209	1 8	Payroll tax for 1954-55	27	0 5
Sale of Sheepskins	26	7 1	General Supplies	999	11 11
Sale of Wool	2,140	0 2	Fencing and Fencing Repairs.....	215	15 5
Agistment Fees	70	6 2	Plant repairs	110	3 10
			Insurance	99	5 0
			Freight and Cartage	213	12 1
			Dipping Charges	18	2 6
			Additions to Buildings	36	6 8
			Purchase of Plant	315	10 0
				3,045	11 3
	£5,628	16 6	Balance at 30th June, 1956	2,583	5 3
				5,628	16 6

Flood Relief.

Disastrous floods in February, 1956, affected many parts of the State and resulted in 967 applications by primary producers for relief. These claims were investigated by field officers of the Department of Agriculture. The Department paid during the financial year 423 claims made by householders and 460 claims for food, clothing, medical supplies and transport. Expenditure from all sources on flood relief amounted to £473,510.

Commonwealth Dairy Industry Extension Grant.

The Commonwealth Government has agreed to the continuance of the grant for a period of five years ending 30th June, 1958, under the terms and conditions set out in the Department's report for the year ended 30th June, 1953.

The first grant was received in October, 1948, and the expenditure to 30th June, 1956, amounted to £481,146 7s. 11d. under the following headings:—

Item.	1948-49 to 1954-55.	1955-56.	Total.
	£ s. d.	£ s. d.	£ s. d.
Organising Officers	76,148 7 1	9,834 2 8	85,982 9 9
General Publicity	38,478 5 11	4,727 14 2	43,206 0 1
Demonstrations	112,423 14 8	12,863 7 11	125,287 2 7
Competitions	7,437 7 4	.....	7,437 7 4
Field Days	88 15 7	.....	88 15 7
Herd Recording	101,168 4 1	19,568 4 4	120,736 8 5
Artificial Insemination	39,362 11 5	20 6 9 2 11*	60,021 14 4
Statistical Work	9,826 3 1	3,526 13 8	13,352 16 9
Herd Surveys	20,540 19 10	3,689 2 4	24,230 2 2
Punch Card Equipment .....	.....	863 10 11	863 10 11
	£ 405,474 9 0	75,671 18 11	481,146 7 11

* Includes £10,541 14s. 5d. for the purchase of bulls and £3,108 10s. 0d. for service fees refunded to the Commonwealth.

Expansion of Agricultural Advisory Services.

The Commonwealth Government agreed to make grants to the States for a period of five years ending 30th June, 1957, to permit of the expansion of the Agricultural Advisory Services.

There was an unexpended balance on the Grant Account at 1st July, 1955, of £5,242 6s. 9d. Grants made by the Commonwealth for the year amounted to £77,000 and expenditure to £69,362 4s. 8d., leaving an unexpended balance of £12,880 2s. 1d. at 30th June, 1956. The expenditure to date has been as follows:—

Financial Year.	Amount. £ s. d.
1952-53	981 8 11
1953-54	45,303 5 9
1954-55	51,116 18 7
1955-56	69,362 4 8
	<u>£166,763 17 11</u>

Rural Training of Ex-Service Personnel.

There were four ex-servicemen in training during the year. Payments made from grants received from the Commonwealth to finance training in 1955-56 amounted to £1,245 17s. 8d.

Argentine Ant Eradication Campaign.

The campaign to eradicate the Argentine Ant was continued during 1955-56. When the campaign commenced in 1952, there were 24 areas, covering 900 acres in 9 municipalities, infested. There are now 125 infested areas, covering 2,400 acres in 17 municipalities. The 101 extra infestations were probably in existence prior to 1952 and the ants have no doubt been transferred by artificial means from some or all of the original 24 areas.

The following is a statement of receipts and payments covering the costs of the campaign for the year:—

RECEIPTS.			PAYMENTS.		
	£	s. d.		£	s. d.
Balance at 1st July, 1955		132 11 9	Wages	4,674	5 2
Consolidated Revenue Fund		2,500 0 0	Payroll Tax	117	6 8
Contributions by Councils	£	s. d.	Workers' Compensation Insurance	223	8 5
Auburn	3,319	2 9	Maintenance of Plant	203	2 1
Bankstown	49	11 11	Maintenance of Motor Vehicles	222	0 0
Botany	2,515	9 1	Travelling Expenses	23	13 4
Canterbury	407	18 10	Spraying Materials	4,260	14 3
City of Sydney	1,303	12 10	General Expenses	140	18 9
Concord	162	3 5	Rewards for reporting newly infested areas	200	0 0
Department of Railways	243	16 6	Credit Balance as at 30th June, 1956	2,307	2 0
Drummoyne	23	14 1			
Kogarah	80	6 7			
Manly	48	2 9			
Maritime Services Board	297	5 9			
Parramatta	576	12 6			
Randwick	141	19 1			
Rockdale	9	18 11			
Strathfield	131	18 10			
Waverley	218	5 1			
		9,539 18 11			
Shell Chemicals (Aust.) Pty. Ltd.—Grant for payment of Rewards		200 0 0			
		<u>£12,372 10 8</u>			<u>£12 372 10 8</u>

Meat Inspection Services.

The Meat Inspection Service was transferred from the Metropolitan Meat Industry Board to the Department on 1st July, 1952.

The Board meets the cost of the service rendered to the Abattoir at Homebush Bay, while the cost of the service elsewhere is covered by fees prescribed by Regulation under the Meat Industry Act, 1915-1952.

The following statement shows the cost of the service, the payments made by the Metropolitan Meat Industry Board and Health Department and the revenue received from inspection fees charged under the Act for the year 1955-56:—

RECEIPTS.			PAYMENTS.		
	£	s. d.		£	s. d.
Homebush Abattoir—			Salaries	54,680	8 2
Payments received from Metropolitan Meat Industry Board.....	60,036	0 10	Payroll Tax	1,367	0 3
Amount owing by Metropolitan Meat Industry Board	2,028	1 10	Workers' Compensation Insurance	682	0 0
			Postal and Telegraphic Expenses	101	11 9
			General Stores	229	13 8
			Stationery and Printing	132	4 1
			Superannuation and Endowment Fund Contributions	3,853	8 4
			Travelling Expenses.....	4	4 9
			Sundry Expenses	0	17 0
			Retirement Leave	1,012	14 8
	£62,064	2 8		£62,064	2 8
Other Slaughterhouses—			Salaries	83,521	9 3
Inspection Fees—			Workers' Compensation Insurance	2,043	0 0
Regulation 7	60,278	6 2	Tea Money.....	2	0 0
Regulation 8	18,412	2 8	Endowment Fund Contributions	1,970	5 6
Regulation 9	20,690	12 3	Rent	119	13 0
Regulation 10	767	12 7	Travelling Expenses.....	5,147	10 0
Inspection Fees in respect of Government Institutions	400	0 0	Freight and Cartage	10	3 2
			Postal and Telephone Expenses	136	18 7
			General Stores	450	11 6
			Gas and Electricity	8	14 7
			Minor Expenses	0	3 4
				93,410	8 11
			Excess of Receipts over payments	7,138	4 9
	£100,548	13 8		£100,548	13 8
Employer's superannuation contributions and pay roll tax have not been included in this statement.			Salaries	1,720	15 11
Knackeries—			Workers' Compensation Insurance	36	8 6
Payments by Department of Health in respect of 1955-56	2,359	14 10	Endowment Fund Contributions	58	9 5
			Travelling Expenses.....	251	15 2
			Excess of Receipts over payments	292	5 10
	£2,359	14 10		£2,359	14 10

Cattle Compensation Act, 1951.

This Act came into operation on 1st September, 1952. Compensation is paid in the following cases:—

- (a) Where an animal is destroyed under order of an Inspector (Stock Diseases Act, Meat Industry Act, or Cattle Slaughtering Act) because of specified diseases;
- (b) where the carcase of an animal is condemned as unfit for human consumption by any such Inspector because of such disease.

Section 9 (2) of the Act provides that 20 per cent. of the compensation payable in respect of tuberculosis during the period of three years after commencement of the Act shall be paid by the Colonial Treasurer out of moneys provided by Parliament for the purpose.

During the financial year 1955-56, 5,874 claims were passed for payment covering 10,930 head of cattle. Compensation paid amounted to £182,925 5s.

The following tabulation shows the various diseases for which cattle were condemned and the amount of compensation paid:—

PAYMENTS FOR CATTLE COMPENSATION.

1st July, 1955, to 30th June, 1956.

Disease.	No. of Claims	No. of Animals.	Amount Paid.		
			Special Deposits Account No. 1265.	Consolidated Revenue Fund.	Total.
			£ s. d.	£ s. d.	£ s. d.
Tuberculosis	3,887	8,258	133,507 18 2	11,961 14 7	145,469 12 9
Actinomycosis ..	1,089	1,351	17,770 17 8	.....	17,770 17 8
Cancer	842	1,167	16,031 10 2	.....	16,031 10 2
Pleuro-pneumonia					
Contagiosa	29	117	2,941 15 3	.....	2,941 15 3
Tick Fever	4	4	100 3 9	.....	100 3 9
Johnin Disease ..	1	1	35 0 0	.....	35 0 0
Trichonomiasis ..	21	29	549 7 11	.....	549 7 11
Vibrios	1	3	26 17 6	.....	26 17 6
Total	5,874	10,930	170,963 10 5	11,961 14 7	182,925 5 0
Fees for Independent Valuers.....			9 8 0	.....	9 8 0
Commission on sale of Cattle					
Duty Stamps			920 2 0	.....	920 2 0
Administration Costs			5,088 17 2	.....	5,088 17 2
Grand Totals			£ 177,581 17 7	11,961 14 7	189,543 12 2

COUNTRY KILLING CENTRES.

The capital expenditure incurred by the Government on the erection of Country Killing Centres to 30th June, 1956, was as follows:—

	£	s. d.
Goulburn	419,063	12 6
Wagga Wagga	410,061	3 4
Dubbo	464,607	0 1
Gunnedah	291,783	10 5

DEPARTMENT OF AGRICULTURE, N.S.W.

STATEMENT OF REVENUE AND RECEIPTS—CONSOLIDATED REVENUE FUND—FINANCIAL YEAR 1955-56.

Institution.	Sale of Farm Produce and Livestock, etc.			Students Fees.			Rents, etc.			Other Receipts.			Gross Receipts.			Receipts Returned.			Nett Receipts.		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
Hawkesbury Agricultural College	15,845	11	5	21,454	17	7	5,686	17	2	1,146	8	8*	44,133	14	10	1,258	7	1	42,875	7	9
Wagga Agricultural College and Experiment Station	13,477	5	4	5,986	7	0	5,344	13	1	456	4	3	25,264	9	8	352	12	8	24,911	17	0
Bathurst Experiment Farm	12,261	12	5	.....	.....	.....	172	17	9	8	16	4	12,443	6	6	2	11	9	12,440	14	9
Berry Artificial Stock Breeding Station	3,301	7	0	.....	.....	.....	.....	.....	.....	.....	.....	.....	3,301	7	0	6	10	0	3,294	17	0
Condobolin Experiment Farm...	3,154	17	0	.....	.....	.....	148	18	0	6	16	1	3,310	11	1	49	7	11	3,261	3	2
Cowra Experiment Farm	2,919	3	10	.....	.....	.....	98	16	8	11	16	7	3,029	17	1	.....	.....	.....	3,029	17	1
Gosford Citrus Experiment Station	719	6	1	.....	.....	.....	130	15	2	.....	.....	.....	850	1	3	2	8	.....	849	18	7
Grafton Experiment Farm	8,028	3	0	.....	.....	.....	265	5	1	122	14	10	8,416	2	11	38	2	7	8,378	0	4
Griffith Viticultural Nursery	856	1	2	.....	.....	.....	33	18	2	.....	.....	.....	889	19	4	3	6	6	886	12	10
Leeton Experiment Farm	5,546	12	4	.....	.....	.....	178	0	11	83	4	7	5,807	17	10	12	5	5	5,795	12	5
Lower Murray Research Station, Coomealla .....	.....	.....	.....	.....	.....	.....	64	16	9	.....	.....	.....	64	16	9	.....	.....	.....	64	16	9
New England Experiment Farm	5,253	6	4	.....	.....	.....	413	18	1	87	17	8	5,755	2	1	32	9	1	5,722	13	0
Seven Hills Poultry Experiment Station	4,175	18	2	.....	.....	.....	155	2	8	5	3	6	4,336	4	4	.....	.....	.....	4,336	4	4
Tamworth Agricultural Research Station	214	2	4	.....	.....	.....	53	16	10	.....	.....	.....	267	19	2	.....	.....	.....	267	19	2
Temora Experiment Farm	4,008	1	9	.....	.....	.....	365	3	10	112	17	1	4,486	2	8	69	4	7	4,416	18	1
Trangie Agricultural Experiment Station	13,923	5	5	.....	.....	.....	2,101	14	11	279	6	8	16,304	7	0	454	6	7	15,850	0	5
Wollongbar Experiment Farm...	5,140	9	8	.....	.....	.....	365	9	2	21	1	2	5,527	0	0	.....	.....	.....	5,527	0	0
Yanco Experiment Farm	7,367	1	11	903	17	0	2,081	9	3	54	8	11	10,406	17	1	482	3	11	9,924	13	2
Less Receipts Returned	106,192	5	2	28,345	1	7	17,661	13	6	2,396	16	4	154,595	16	7	2,761	10	9	151,834	5	10
	782	2	4	1,266	7	8	713	0	9	.....	.....	.....	2,761	10	9	.....	.....	.....	.....	.....	.....
Total	105,410	2	10	27,078	13	11	16,948	12	9	2,396	16	4	151,834	5	10	2,761	10	9	151,834	5	10

* Includes £500 subsidy by C.S.I.R.O., in connection with work at Hawkesbury Agriculture College on growing vegetables for special processing investigation.

Section.	Particulars.	Receipts (Gross).	Receipts Returned.	Nett Receipts.
		£ s. d.	£ s. d.	£ s. d.
Central Administration	Fees—Farm Produce Agents Act	308 3 0	.....	308 3 0
	Fees—Fertilisers Act	180 12 0	.....	180 12 0
	Fees—Veterinary Surgeons Act	909 6 7	12 12 0	896 14 7
	Fees—Registration of Stock Brands	1,522 14 5	51 7 2	1,471 7 3
	Fees—Registration of Swine Brands	346 6 1	4 12 0	341 14 1
	Fees—Stock Foods and Medicines Act	1,049 19 0	9 9 0	1,040 10 0
	Fees—Apiaries Act	2,740 8 8	33 12 0	2,706 16 8
	Fees—Pest Destroyers Act	499 19 0	10 10 0	489 9 0
	Fees—Public Officers Witness Expenses	7 0 0	28 0 0	21 0 0
	Fees—Public Officers—Transcript of Evidence	6 6 8	.....	6 6 8
	Fees—Analyses	127 19 0	.....	127 19 0
	Fees—Flour Certificates	705 3 0	.....	705 3 0
	Fees—Testing Dairy Glassware	136 8 0	.....	136 8 0
	Fines and Forfeitures	21 12 0	.....	21 12 0
	Forfeitures of Bonds	2,738 2 7	50 0 0	2,688 2 7
	Commission for collection of Public Service Associations and Professional Officers Association Subscriptions	132 13 5	.....	132 13 5
	Commission for collection of Premiums—Group Assurance Scheme	547 5 6	.....	547 5 6
	Commission for collection of Metropolitan Hospitals Fund and Medical Benefits Fund Contributions ..	125 0 10	.....	125 0 10
	Interest on Advances—Dingo Extermination	10 2 6	.....	10 2 6
	Sale of Government Property	2,342 12 0	.....	2,342 12 0
	Sundry Sales	112 9 2	52 11 1	59 18 1
	Transfer of Part Balances	217 9 1	.....	217 9 1
	Exchange on Cheques and Remittances	243 6 0	.....	243 6 0
	Three Per Cent. Contribution by Pastures Protection Boards	17,897 17 2	.....	17,897 17 2
	Broadcasting Fees	51 10 8	42 8 11	9 1 9
	Postages	38 11 9	.....	38 11 9
	Licence Fees—Pastures Protection Act	12 10 0	4 3 6	8 6 6
	Contributions re Scholarships .....	.....	.....	.....
	Costs recovered by Crown Solicitor in various actions	9 14 0	.....	9 14 0
	Employer's Liability to the State Superannuation Fund	3,301 19 3	.....	3,301 19 3
	Administration of Cattle Compensation Fund	5,688 17 2	.....	5,688 17 2
	Total	42,031 18 6	299 5 8	41,732 12 10
Division of Plant Industry	Fees—Seed Testing	184 16 0	2 2 0	182 14 0
	Fees—Certification of Bean Seed	631 12 6	5 10 0	626 2 6
	Fees—Certification of Sweet Sorghum Seed	480 1 0	.....	480 1 0
	Fees—Certification of Seed—General	11,105 8 9	29 18 6	11,075 10 3
	Fees—Registration of Hybrid Seed Maize	1,071 1 0	3 0 0	1,068 1 0
	Contribution by Commonwealth Government .....	.....	.....	.....
	Administration of Plant Quarantine	1,158 4 0	.....	1,158 4 0
Commonwealth Government Contribution towards cost of Experimental and Demonstration Work in connection with Tobacco Leaf Production .....	.....	1,451 17 4	.....	1,451 17 4
	Total	16,083 0 7	40 10 6	16,042 10 1

STATEMENT OF REVENUE AND RECEIPTS—CONSOLIDATED REVENUE FUND—FINANCIAL YEAR 1955-56—continued.

Section.	Particulars.	Receipts (Gross).	Receipts Returned.	Nett Receipts.
		£ s. d.	£ s. d.	£ s. d.
Division of Horticulture	Inspection Fees—Plant Diseases Act	20,120 11 1	93 9 2	20,027 1 11
	Fees—Certification of Seed Potatoes	459 18 10	.....	459 18 10
	Contribution by Commonwealth Government Admin- istration of Plant Quarantine	21,197 5 5	16 19 8	21,180 5 9
	Contribution by Commonwealth Government Admin- istration of Commerce Act	7,265 1 7	.....	7,265 1 7
	Private Telephone Calls—Payments by Officers	1 4	.....	1 4
	Total	49,042 18 3	110 8 10	48,932 9 5
Division of Dairying	Commonwealth Grant towards cost of Herd Recording	19,568 4 4	.....	19,568 4 4
	Fees—Herd Recording	32,363 2 3	11 12 4	32,351 9 11
	Fees—Dairy Industry Act	514 15 6	1 0 0	513 15 6
	Fees—Dairy Science Schools	209 18 0	5 15 6	204 2 6
	Total	52,656 0 1	18 7 10	52,637 12 3
Division of Animal Industry— Head and District Offices.	Fees—Cattle Export	84 7 0	.....	84 7 0
	Fees—Chicken Sexing Examinations	1 1 0	.....	1 1 0
	Fees—Inspection of Honey	46 15 0	0 17 6	45 17 6
	Fees—Pullorum Testing of Fowls .....	.....	.....	.....
	Fees—T.B. Tests of Cattle	266 19 0	0 10 0	266 9 0
	Fees—Testing for Brucellosis in Cattle	1 1 0	.....	1 1 0
	Fees—Testing for Brucellosis in Swine .....	.....	.....	.....
	Fees—Vaccination of Calves	11 12 0	.....	11 12 0
	Fees—Meat Industry Act	162,190 1 11	8 9 0	162,181 12 11
	Contribution by Commonwealth Government— Administration of Animal Quarantine	9,897 5 5	.....	9,897 5 5
	Contribution by Milk Board—T.B. Testing of Herds	4,038 4 11	.....	4,038 4 11
	Sale of Livestock, Sheepskins, etc.—Glenfield Veterinary Research Station	3,319 17 1	50 0 6	3,269 16 7
	Private Telephone Calls—Glenfield Veterinary Research Station	22 14 1	.....	22 14 1
	Electricity supplied to Officers—Glenfield Veterinary Research Station	69 16 11	.....	69 16 11
	Exchange on Cheques and Remittances—Glenfield Veterinary Research Station	1 17 6	.....	1 17 6
	Rents—Glenfield Veterinary Research Station	248 8 2	.....	248 8 2
	Total	180,200 1 0	59 17 0	180,140 4 0
Division of Animal Industry— Queensland Border Area.	Fees—for Dipping Stock	4,364 15 8	.....	4,364 15 8
	Rents	645 13 9	2 11 5	643 2 4
	Exchange on Cheques and Remittances	5 2 5	.....	5 2 5
	Total	5,015 11 10	2 11 5	5,013 0 5
Division of Animal Industry— Tick Quarantine Areas.	Fumigation Fees	16 13 4	.....	16 13 4
	Rents	26 0 0	.....	26 0 0
	Contribution by Commonwealth Government in respect of Cattle Tick Eradication	551,750 0 0	.....	551,750 0 0
	Exchange on Cheques and Remittances	4 0	.....	4 0
	Total	551,792 17 4	.....	551,792 17 4
Botanic Gardens and Allied Activities.	Ground Fees, Kiosk Rents etc.,	1,567 19 8	.....	1,567 19 8
	Rents	510 0 1	.....	510 0 1
	Lavatory Takings	168 15 2	.....	168 15 2
	Contribution by Commonwealth Government— Maintenance of Gardens at Admiralty House	4,745 2 11	.....	4,745 2 11
	Total	6,991 17 10	.....	6,991 17 10
Grain Elevators	Handling Fees, etc	115,753 9 9	.....	115,753 9 9
	Total	115,753 9 9	.....	115,753 9 9
Department of Agriculture	Repayments to Credit of votes—Previous Years	17,440 5 10	8 4	17,439 17 6

SUMMARY OF RECEIPTS.

Particulars.	Receipts (Gross).	Receipts Returned.	Nett Receipts.
	£ s. d.	£ s. d.	£ s. d.
Agricultural Colleges, Farms, Stations and Nurseries	154,595 16 7	2,761 10 9	151,834 5 10
Central Administration, Divisions etc.....	1,019,567 15 2	531 1 3	1,019,036 13 11
Department of Agriculture—Repayments to Credit of Votes—Previous Years	17,440 5 10	8 4	17,439 17 6
	£ 1,191,603 17 7	3,293 0 4	1,188,310 17 3

EXPENDITURE FROM CONSOLIDATED REVENUE FUND AND GENERAL LOAN ACCOUNT, 1955-56.
(See separate statement for Expenditure from Special Deposits Account.)

Section.	Consolidated Revenue Fund.										General Loan Account.		Total Expenditure by Department of Agriculture.		Consolidated Revenue Fund.				General Loan.		Total Expenditure by Other Departments.		Grand Total Expenditure.																																																																																																																																																																																																																																																																																																																																																																																																																																																										
	Salaries and Payments in the nature of Salary.					Maintenance and Working Expenses other than Salaries.					Other Services.		Total.		General Loan Account.		Total Expenditure by Department of Agriculture.		Government Stores Department. (1)		Government Printer.		Government Real Estate Office.		Department of Public Works. (2)		Department of Public Works.		Total Expenditure by Other Departments.		Grand Total Expenditure.																																																																																																																																																																																																																																																																																																																																																																																																																																																		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.																																																																																																																																																																																																																																																																																																																																																																																																																																																
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.																																																																																																																																																																																																																																																																																																																																																																																																																																													
Central Administration	447,403	16	11	43,098	8	9	37,741	1	2	528,243	6	10	3,518	6	4	531,761	13	2	30,134	0	8	287	19	5	29,464	2	3	127,831	18	0	659,593	11	2	659,593	11	2																																																																																																																																																																																																																																																																																																																																																																																																																																													
Division of Plant Industry	140,773	2	11	30,911	12	11	2,254	17	0	173,939	12	10	43,033	9	10	173,939	12	10	590	4	8	2,041	1	7	1,497	2	6	2,038	9	3	176,023	2	1	176,023	2	1																																																																																																																																																																																																																																																																																																																																																																																																																																													
Division of Horticulture—																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
Fruit	98,654	18	1	20,261	6	7	5,406	14	8	124,412	19	4				124,412	19	4	530	0	1	4	12	10	1,441	13	8	1,976	6	7	126,389	5	11	126,389	5	11																																																																																																																																																																																																																																																																																																																																																																																																																																													
Export and Import Branch	16,378	9	8	1,810	8	11	346	3	5	20,138	18	7				20,138	18	7																																																																																																																																																																																																																																																																																																																																																																																																																																																															
Plant Quarantine Service	17,992	16	9	1,276	10	5				19,615	10	7				19,615	10	7																																																																																																																																																																																																																																																																																																																																																																																																																																																															
Division of Dairying—																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
General	61,173	5	1	14,180	17	6	100	0	0	75,454	2	7				75,454	2	7	802	17	9																																																																																																																																																																																																																																																																																																																																																																																																																																																												
Herd Recording	63,967	13	0	20,043	18	0				84,496	11	0				84,496	11	0	1,346	1	7	2,041	17	1	1,497	2	6	7,581	16	4	232,279	2	0	232,279	2	0																																																																																																																																																																																																																																																																																																																																																																																																																																													
Hawkesbury Agricultural College	108,099	3	5	53,813	5	9	11,751	7	5	171,663	16	7	43,033	9	10	173,697	6	10	177	1	5	943	16	9	541	19	8	1,662	17	10	175,458	8	8	175,458	8	8																																																																																																																																																																																																																																																																																																																																																																																																																																													
Wagga Agricultural College	51,719	3	8	20,190	4	9	9,767	15	3	81,677	3	8	92,113	7	2	173,795	10	10																																																																																																																																																																																																																																																																																																																																																																																																																																																															
Alisonville Tropical Fruit Research Station										195	6	2	369	6	0	564	12	2																																																																																																																																																																																																																																																																																																																																																																																																																																																															
Bathurst Experiment Farm	13,688	10	4	6,399	19	6	2,138	14	11	22,237	7	3				22,237	7	3	9	10	5	137	16	8	94	15	3	232	11	9	22,555	19	0	22,555	19	0																																																																																																																																																																																																																																																																																																																																																																																																																																													
Condon Experiment Farm	11,414	18	9	11,154	13	5	1,607	6	7	24,176	18	9				24,176	18	9	9	15	3																																																																																																																																																																																																																																																																																																																																																																																																																																																												
Cowra Experiment Farm	7,028	16	9	3,324	13	5				10,353	10	2				10,353	10	2	1	17	5	25	1	3	110	4	2	135	5	5	10,483	15	7	10,483	15	7																																																																																																																																																																																																																																																																																																																																																																																																																																													
Gosford Virus Research Station	12,437	3	10	2,363	16	4	202	5	3	15,223	5	5				15,223	5	5	39	10	5																																																																																																																																																																																																																																																																																																																																																																																																																																																												
Granton Experiment Farm	26,739	5	5	7,901	19	8	1,393	5	0	35,034	10	1	3,069	8	7	38,103	18	8																																																																																																																																																																																																																																																																																																																																																																																																																																																															
Griffith Viticultural Nursery	4,145	15	3	798	2	4				4,943	17	7				4,943	17	7	8	5	4																																																																																																																																																																																																																																																																																																																																																																																																																																																												
Leon Experiment Farm	12,983	0	3	4,350	7	11	398	19	9	18,232	7	11				18,232	7	11																																																																																																																																																																																																																																																																																																																																																																																																																																																															
Low Murray Research Station	765	12	4	862	15	10	426	5	4	2,064	13	6	7,040	19	4	9,095	12	10																																																																																																																																																																																																																																																																																																																																																																																																																																																															
New England Experiment Farm	20,540	15	4	7,225	4	8	1,123	4	9	28,889	4	9				28,889	4	9	52	10	5																																																																																																																																																																																																																																																																																																																																																																																																																																																												
Seven Hills Poultry Experiment Farm	13,222	4	2	5,612	15	9	1,107	1	5	18,942	1	4				18,942	1	4	20	4	0	71	0	0	295	12	1	335	14	0	29,224	18	9	29,224	18	9																																																																																																																																																																																																																																																																																																																																																																																																																																													
Temworth Agricultural Research Station	12,439	14	1	5,511	10	4	1,110	13	2	19,064	19	1	945	0	0	19,064	19	1	12	0	7	121	15	1	179	0	8	15	5	10	19,328	17	5	19,328	17	5																																																																																																																																																																																																																																																																																																																																																																																																																																													
Tumbarumba Experiment Farm	10,434			6,531	1	2				16,096	4	1	278	0	4	16,374	4	1	14	0	8																																																																																																																																																																																																																																																																																																																																																																																																																																																												
Triangle Agricultural Experiment Station	18,026	19	7	10,978	17	4	7,600	2	8	36,606	19	4				36,606	19	4	33	13	2																																																																																																																																																																																																																																																																																																																																																																																																																																																												
Woolongong Experiment Farm	13,619			8,085	17	4	213	15	10	23,049	5	9				23,049	5	9	67	9	8	723	2	0	843	11	0	1,634	2	8	57,312	15	0	57,312	15	0																																																																																																																																																																																																																																																																																																																																																																																																																																													
Yanco Experiment Farm	32,739	7	0	14,490	8	2	8,448	17	0	55,678	12	4				55,678	12	4																																																																																																																																																																																																																																																																																																																																																																																																																																																															
Tobacco Research	1,832	5	0	1,819	8	2				3,651	13	2				3,651	13	2																																																																																																																																																																																																																																																																																																																																																																																																																																																															
Division of Animal Industry.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
Head and District Offices	112,119	1	11	24,280	0	9	16,242	6	1	152,641	8	9				152,641	8	9	958	8	0	1	2	6	849	5	11	1,808	16	5	154,450	5	2	154,450	5	2																																																																																																																																																																																																																																																																																																																																																																																																																																													
Glenfield Veterinary Research Station	37,730	9	3	10,993	10	0	1,074	5	4	49,798	4	7	70	2	7	49,868	7	2	38	5	10	226	3	9	765	11	11	1,030	1	6	50,898	8	5	50,898	8	5																																																																																																																																																																																																																																																																																																																																																																																																																																													
Shannon Vale Nutrition Station																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
Meat Inspection Service—																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
Hornbush	55,693	2	10	2,398	6	2				58,091	9	0				58,091	9	0																																																																																																																																																																																																																																																																																																																																																																																																																																																															
Other Abattoirs	83,521	9	3	9,888	19	8				93,410	8	11				93,410	8	11																																																																																																																																																																																																																																																																																																																																																																																																																																																															
Knackeries	1,720	15	11	346	13	1				2,067	9	0				2,067	9	0																																																																																																																																																																																																																																																																																																																																																																																																																																																															
Animal Quarantine Service	9,973	15	0	1,415	19	1				11,389	14	1				11,389	14	1																																																																																																																																																																																																																																																																																																																																																																																																																																																															
Queensland Border Control	35,476	4	11	11,444	7	7				46,920	12	6				46,920	12	6																																																																																																																																																																																																																																																																																																																																																																																																																																																															
Tick Quarantine Areas	595,065	15	7	396,291	2	8	67,310	10	7	1,039,107	8	10				1,039,107	8	10																																																																																																																																																																																																																																																																																																																																																																																																																																																															
Botanic Gardens and Allied Activities—																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
The Gardens and Allied Activities	71,493	13	7	8,546	17	10	1,252	16	9	81,293	8	2	169	18	0	81,463	6	2	378	14	9	65	10	9	401	17	10	846	3	4	82,309	9	6	82,309	9	6																																																																																																																																																																																																																																																																																																																																																																																																																																													
Government Domain	8,078	5	8	731	19	7	83	14	6	8,893	19	9				8,893	19	9																																																																																																																																																																																																																																																																																																																																																																																																																																																															
Centennial Park	17,941	5	0	1,842	18	10	88	14	6	19,267	18	4				19,267	18	4																																																																																																																																																																																																																																																																																																																																																																																																																																																															
Totals	2,294,444	9	7	768,543	6	6	181,238	2	9	3,134,275	18	10	149,999	0	8	3,334,274	19	6	32,245	15	8	4,963	17	0	44,892	2	8	1,52,959	12	2	3,493,214	11	8	3,493,214	11	8																																																																																																																																																																																																																																																																																																																																																																																																																																													
(1) Being Expenditure on—																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	</

Expenditure Figures not available from Premier's Department.

OTHER ACCOUNTS.

Name of Account.	Balance as at 1st July, 1955.		Receipts 1955-56.		Payments 1955-56.		Balance as at 30th June, 1956	
	£	s. d.	£	s. d.	£	s. d.	£	s. d.
Advances to Officers for Purchase of Motor Cars	Dr. 88,687	8 8	29,440	6 11	38,813	9 2	Dr. 98,060	10 11*
Contribution towards Running Expenses of Tractor Mower at Centennial Park	229	17 9	180	0 0	.....	.....	409	17 9*
Potato Growers' Licensing Act, 1940	527	1 1	1,516	8 6	1,641	18 3	401	11 4*
Construction, Maintenance and Improvement of Public Watering Places in the Western Division.....	.....	.....	2,110	14 5	2,110	14 5	.....	0 0*
Balance of Salaries Adjustment Suspense Account	24,927	17 11	40,079	17 10	24,927	17 11	40,079	17 10*
Government Printing Office—Working Account and Stores Account and Sale of Publications .....	.....	.....	784	14 9	37	9 6	747	5 3*
Ministerial Employees Leave—Payments to Employees or Their Widows, Children, or Dependent Relatives	419	7 11	.....	.....	419	7 11	.....	0 0*
Noxious Insects Destruction Account	13,066	4 4	164,027	5 7	163,399	4 1	13,694	5 10*
Swine Compensation Fund	23,228	5 1	57,255	10 10	45,992	16 5	34,490	19 6*
Treasury Fire Risks	823	0 0	.....	.....	823	0 0	.....	0 0*
Purchase of Milk and Cream—Hawkesbury Agricultural College... ..	4,685	2 4	14,371	8 10	12,017	10 10	7,039	0 4*
Motor Vehicles Purchasing Account	300	0 0	.....	.....	300	0 0	.....	0 0*
Hawkesbury Agricultural College Canning Factory Account	680	2 4	840	8 7	577	19 5	942	11 6*
Hawkesbury Agricultural College—Dairying Factory Working Account .....	.....	.....	72,157	8 9	69,447	3 11	2701	4 10*
Deposit on Tenders.....	590	0 0	.....	.....	590	0 0	.....	0 0*
Farm Produce Agents' Act, 1926	220	12 4	1,134	9 9	1,355	2 1	.....	0 0*
Unclaimed Moneys Account	790	3 1	369	17 0	591	12 1	568	8 0*
Rural Training of Ex-Servicemen	794	18 10	1,000	0 0	1,245	7 8	549	11 2*
Commonwealth Grant towards the Promotion of Improved Practices in the Dairying Industry	20,052	10 4	67,956	18 8	75,671	18 11	12,337	10 1*
Compensation for Losses Sustained from Experiments Relating to The Wool Industry	2,000	0 0	.....	.....	2,000	0 0	.....	0 0*
Argentine Ant Eradication Campaign	132	11 9	12,239	18 11	10,065	8 8	2,307	2 0*
Commonwealth Grant—Expansion of Agricultural Advisory Services—New South Wales	5,242	6 9	77,000	0 0	69,362	4 8	12,880	2 1*
Flood Relief Scheme, 1954	10,512	0 9	2,078	8 0	12,590	8 9	.....	0 0*
Cattle Compensation Fund	41,497	14 2	203,913	14 4	197,581	17 7	47,829	10 11*
Flood Relief Scheme, 1955	88,679	5 9	223,635	0 8	262,369	14 2	49,944	12 3*
Flood Relief Scheme—Contribution by Government of United Kingdom	967	10 0	.....	.....	967	10 0	.....	0 0*
Grain Elevators Board Account	12,823	15 10	.....	.....	12,823	15 10	.....	0 0*
Flood Relief Scheme, 1955—Proceeds of Appeals and Contributions forwarded to the Government of New South Wales for Relief of Flood Victims	128,412	17 6	.....	.....	126,059	0 11	2,353	16 7*
Hawkesbury Agricultural College Trust Account	1,090	9 7	6,352	15 1	7,667	6 10	Dr. 224	2 2*
Wagga Agricultural College Trust Account	814	2 1	1,294	19 6	1,027	0 7	1,082	1 0*
Advertising—Department of Agriculture Publications Account... ..	602	0 3	7,976	9 1	7,546	19 0	1,031	10 4*
Chicken Sexing—Purchasing of Chickens .....	.....	.....	26	0 0	13	0 0	13	0 0*
Commonwealth Bank (Rural Credits Development Fund) Grant towards Purchase of Cameras for District Officers	0	19 10	.....	.....	.....	19 10	.....	0 0*
Commonwealth Bank (Rural Credits Development Fund) Grant towards Erection of Glasshouse, Hawkesbury Agricultural College	2,000	0 0	.....	.....	1,997	12 8	2	7 4*
Contribution by C.S.I.R.O. towards Cost of Research into Metabolic Diseases of Sheep and Endocrinology—Glenfield Veterinary Research Station.....	.....	.....	2,246	0 0	1,534	18 7	711	1 5*
Contribution by C.S.I.R.O. towards Construction of Animal House at Trangie .....	.....	.....	5,500	0 0	.....	.....	5,500	0 0*
Contribution by C.S.I.R.O. towards Ecto-Parasite Survey.....	.....	.....	3,500	0 0	295	11 0	3,204	9 0*
Contribution by C.S.I.R.O. towards Fleecce Testing work at Trangie.....	.....	.....	1,000	0 0	.....	.....	1,000	0 0*
Contribution by Department of Commerce and Agriculture towards Development of Auto-Stripper.....	.....	.....	600	0 0	115	8 7	484	11 5*
Contribution by Milk Board towards Cost of Herd Testing .....	.....	.....	60	4 8	60	4 8	.....	0 0*
Contributions by States towards Salary and Expenses of Patrol Officer, Grasshopper Control	279	0 0	3442	9 2	1304	6 9	2,417	2 5*
Contributions towards cost of Miss A. Myers' trip abroad, 1956 .	.....	.....	1,470	0 0	.....	.....	1,470	0 0*
Contribution towards cost of N. M. Foskett's attendance at Associated Country Women Conference (Ceylon).....	.....	.....	550	0 0	.....	.....	550	0 0*
Contribution towards cost of attendance of Departmental Delegates to New Zealand Grasslands Conference .....	.....	.....	750	0 0	.....	.....	750	0 0*
Contributions towards Establishment of Library at Agricultural Research Institute, Wagga	45	9 7	.....	.....	.....	.....	45	9 7*
Cowra Machinery Pool Hire Charges Account .....	.....	.....	60	18 9	60	18 9	.....	0 0*
Department of Agriculture Suspense Account	2,527	5 2	18,598	18 8	16,632	4 2	4,493	19 8*
Fat Steer Competition—Wagga Abattoirs .....	.....	.....	30	0 0	30	0 0	.....	0 0*
Fire Damage Account	426	10 0	7,163	16 6	1,604	12 10	5,985	13 8*
Hawkesbury Agricultural College Egg Laying Competition Prize Fund	221	3 7	358	14 0	158	4 3	421	13 4*
Honey Marketing Board	20	0 0	.....	.....	20	0 0	.....	0 0*
Horse Breeding Fund	2,245	6 2	.....	.....	2,102	7 4	142	18 10*
Interstate Meat Co. Pty. Ltd.—Bursary—Wagga.....	4	7 7	.....	.....	4	3 9	.....	3 10*
Leeton Machinery Pool Hire Charges Account .....	.....	.....	7	8 5	7	8 5	.....	0 0*
McGarvie Smith Institute—Contribution towards Running Expenses of Nutritional Station at Glen Innes	3,183	1 5	3,819	18 1	4,419	14 3	2,583	5 3*
McGarvie Smith Institute—Contribution to Nutritional Research Laboratory, Glenfield	1,306	14 0	.....	.....	609	6 1	697	7 11*
Pastures Protection Boards of New South Wales—Subsidy to Glenfield Veterinary Research Station	92	5 6	1,600	0 0	873	17 1	818	8 5*
W. S. Pender Memorial Fund—Interest on Bonds	168	0 3	31	5 0	3	2 6	196	2 9*
Rice Research Laboratory, Yanco	2,000	0 0	.....	.....	.....	.....	2,000	0 0*

OTHER ACCOUNTS—continued.

Name of Account.	Balance as at 1st July, 1955.	Receipts 1955-56.	Payments 1955-56.	Balance as at 30th June, 1956.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Sale of Booklet "The Home Vegetable Garden"	42 7 11	.....	42 7 11	0 0*
Sale of Book "Farm Management and Elementary Agricultural Economics"	3 11	5 0	.....	8 11*
Sale of Photographic Prints .....	.....	7 5 0	4 3 8	3 1 4*
Sale of Rural Training Booklets—Wagga	10 7	1 9 0	.....	1 19 7*
Stamp Duty on Agreement—Wheat Stacking Sites	10 10 0	.....	9 15 0	15 0*
State Wheat Pools Account .....	.....	5 2 7	5 2 7	0 0*
Toxaemic Jaundice Investigations	11 18 11	.....	11 18 11	0 0*
Tropical Fruit Research Station	5,000 0 0	.....	.....	5,000 0 0*
Unclaimed Salaries and Wages	456 0 4	1,138 8 10	864 18 5	729 10 9*
Total	£ 315,464 3 10	1,039,684 19 8	1,182,810 7 7	172,338 15 11

APPENDIX II.

Published Matter,* 1955-56.

* viz.: Matter printed as Department of Agriculture (D. of A.) booklets, or contributed to and printed as articles in Department of Agriculture journals (the monthly *Agricultural Gazette of N.S.W.*, the quarterly *Review of Marketing and Agricultural Economics*, the bi-monthly *Herd Recorders' Letter* or *Dairy Topics*) or the journals of other institutions/organisations.

The Appendix does not list the many times greater volume of items contributed, in the course of extension service, to such media as the Department's weekly printed broadsheet *Press Copy*, and regional publicity bulletins (processed), for syndication to newspapers (and radio stations). A statistical account of that published matter is included in this Report under "DIVISION of INFORMATION & EXTENSION SERVICES—Editorial Section—Regional Publicity—" and "M.I.A. AGRICULTURAL SERVICE".

A. DIVISION OF PLANT INDUSTRY.

D. of A. Booklets.

- Anon.—Bean Growing in New South Wales. 11 pp., ill.
 Anon.—Storage of Grain on Farms. 8 pp., ill.
 Orman, A.C.—Canliflower Growing. 8 pp., ill.

Contributions to Journals.

Arthur, J. M., and Jenkins, H. V.—Establishment of Subterranean Clover on the Far North Coast. *Agric. Gaz. N.S.W.* 67: 170-5.

Ballard, J. H.—Harvesting Subterranean Clover (*Trifolium subterraneum*) Seed. *Agric. Gaz. N.S.W.* 67: 114-7.

Brown, C. Walkden.—Oat and Barley Varieties. *Agric. Gaz. N.S.W.* 67: 24-5.

Brown, C. Walkden.—Wheat Varieties. *Agric. Gaz. N.S.W.* 67: 58-66.

Cuthbertson, E. G.—Furrowing Improves Natural Pasture. *Agric. Gaz. N.S.W.* 66: 515-8.

Darley, E. C.—Why Lose Twenty-five Per Cent. of Your Maize Yield? *Agric. Gaz. N.S.W.* 66: 366-88.

England, J. C.—Oat Variety Yields over 90 Bushels. *Agric. Gaz. N.S.W.* 66: 639.

Godden, G. R.—Keep Paterson's Curse (*Echium plantagineum*) Out. *Agric. Gaz. N.S.W.* 66: 664.

Godden, G. R.—Irrigation Methods. *Agric. Gaz. N.S.W.* 66: 357-8; 396-9.

Green, K. R.—The Problem of Serrated Tussock (*Nassella trichotomia*). *Agric. Gaz. N.S.W.* 67: 8-14; 123-6.

Hartridge, F. J., and Weir, R. G.—Use Lime When Sowing Clover. *Agric. Gaz. N.S.W.* 66: 663.

Hartridge, F. J., Pulsford, J., and Davison, J. W.—Strip Grazing of Pastures. *Agric. Gaz. N.S.W.* 67: 282-6.

Kavanagh, L. R.—Sowing of Hybrid Maize, Results of Trials as a Guide to Growers. *Agric. Gaz. N.S.W.* 67: 360-5.

Lloyd, J. R.—Electricity on the Dairy Farm. *Agric. Gaz. N.S.W.* 67: 26-8; 118-22.

Moraghan, J. T., and Weir, R. G.—Sulphur and Plant Nutrition in New South Wales. *Agric. Gaz. N.S.W.* 67: 176-9.

Moraghan, J. T.—Lime Superphosphate Mixtures. *Agric. Gaz. N.S.W.* 67: 271.

Morris, F. C.—Rabbit Eradication. *Agric. Gaz. N.S.W.* 66: 460-2.

Nicholson, F. J.—Two New Summer Fodder Crops for the Tumut and Tumbarumba Districts. *Agric. Gaz. N.S.W.* 66: 511-4.

Orman, A. C.—Marrows and Squashes. *Agric. Gaz. N.S.W.* 66: 653-4.

Peterson, A. S.—Government Certified Sweet Sorghum Seed. *Agric. Gaz. N.S.W.* 66: 506-10.

Peterson, A. S.—Castor Bean Research in New South Wales. *Agric. Gaz. N.S.W.* 67: 29-33; 144-7.

Tindale, E.—Subterranean Clover (*Trifolium subterraneum*) and Skeleton Weed (*Chondrilla juncea*) Spraying. *Agric. Gaz. N.S.W.* 66: 649-51.

Tindale, E.—The Use of Sheep in Controlling Skeleton Weed (*Chondrilla juncea*). *Agric. Gaz. N.S.W.* 66: 369-71.

Years, C. K., Marshall, K. C., and Craddock, F. W.—Important Factors in Pasture Establishment. *Agric. Gaz. N.S.W.* 67: 301-3.

Waring, E. J.—Bean Growing on the Far North Coast. *Agric. Gaz. N.S.W.* 67: 248-50.

Walker, M. H.—Will it pay? Ploughing Phalaris for Seed. *Agric. Gaz. N.S.W.* 66: 368-90.

B. DIVISION OF HORTICULTURE.

D. of A. Booklets.

Anon.—Home Orchard Calendar. 7th Ed., 28 pp., ill.

Ballantyne, J. A., and Whittaker, E. C.—Re-Working Apple and Pear Trees. 19 pp., ill.

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